

**WATER QUALITY
BEST MANAGEMENT PRACTICES FOR
OPERATION AND MAINTENANCE OF
PUBLICLY-OWNED PROPERTY**

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Prepared by

Clark County Public Works Department

In cooperation with the City of Vancouver

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Chapter 1. Operation's Activities That Require Water Quality BMPs

Introduction

Water quality protection is now a consideration for all activities performed by the county and city. Many activities, such as road construction have specific water resource protections in county or city code. Other activities, such as storm sewer maintenance, have not been required to meet specific water quality requirements.

In November 1998, Clark County adopted the Water Quality Ordinance that requires businesses and public agencies to use water quality protection practices, referred to as best management practices or BMPs, to eliminate or reduce pollution from their outdoor activities.

Earlier, in 1997, Clark County adopted regulations limiting the clearing of vegetation in Habitat Conservation Areas, chiefly near streams. County operations are subject to this ordinance.

Purpose

This manual is intended to meet specific needs of Clark County and the City of Vancouver. The goal is to provide standard water quality and vegetation management practices for each activity maintenance crews perform.

Scope

Water quality protection practices are addressed here. These include two main categories:

- Practices to eliminate or reduce the pollution caused by operation and maintenance activities such as ditch cleaning or road repairs and
- Practices to assure that water quality BMPs such as swales and treatment ponds are maintained to make sure they are performing as intended.

Habitat preservation practices are largely avoiding or minimizing vegetation removal and the use of chemical controls, and promoting native vegetation where feasible.

Practices in this manual are subject to updates as more detailed storm sewer and road maintenance standards are developed.

Method for Creating this Manual

Other manuals were reviewed. Notable examples include the ODOT Water Quality and Habitat Guide (June 1997), City of Portland Parks Department Policies and Procedures for Pest Management, and the King County Road Maintenance BMP Manual (September 1998). This manual draws on these manuals to present lists of best management practices for numerous operation and maintenance activities. King County's manual lists and describes in detail, BMPs that might apply to thirteen broad categories of activity. The ODOT Guide lists in general language, the BMPs that should be applied to each of 92 specific tasks. To suit Clark County needs, this manual combines some of the ODOT tasks and adds activities that ODOT does not include, such as maintaining storm sewer facilities and park land.

Best management practices are compiled from several manuals, programs, or guides. They are:

- Clark County NPDES stormwater management program (April, 1999)
- Clark County Public Works internal assessments of activities affected by the ESA (spring 1999)
- ODOT (June 1997) Maintenance BMPs for Water Quality and Habitat
- AWQA (June 1998) Oregon Toolbox
- King County (September 1998) Appendix A, Private Facilities Maintenance Requirements
- City of Portland, Parks and Recreation Bureau, April 1999, Waterways Pest Management Policy
- Washington Department of Ecology (February 1992) Stormwater Management Manual for the Puget Sound Basin
- WDOT (February 1995) Highway Runoff Manual
- Tri-County ESA 4(d) stormwater proposal maintenance standards (April 2000)

County and city Operations managers reviewed the manual for completeness and usability.

Manual Layout

The manual lists activities to operate storm sewers, maintain roads, operate shops and maintenance yards, and perform park and landscape maintenance.

For each activity, this manual:

- Briefly describes the activity which needs BMPs.
- Lists the water quality and non-water quality outcomes from the activity. In many cases there is added description of the desired outcome for the an activity.
- Lists the BMPs to meet the water quality protection requirements.

Activities

Activities are the actions that road and storm sewer maintenance crews take in the routine performance of their jobs. Some activities such as catch basin cleaning are water quality best management practices. Others, such as ditch maintenance require best management practices. The activities are listed in the table of contents.

Activities covered by this manual may include small capital projects and overlays, but any project with work in a habitat buffer or stream channel is a larger project that requires permitting and specific BMPs beyond those included here.

Outcomes

Each activity meets desired outcomes, which are listed for each activity. There are two sets of outcomes for each activity:

- Water Quality Outcomes
- Infrastructure Maintenance Outcomes

This manual provides practices to reach the water quality outcomes and infrastructure maintenance requirements specific to water quality or habitat protection.

The Water Quality Outcomes are:

- O1 Minimize sediment and pollutant discharges from the work area
- O2 Prevent county/city roads, drainage systems, facilities and property from becoming pollutant sources
- O3 Minimize vegetation removal
- O4 Preserve native plants

The Infrastructure Maintenance Outcomes are:

- O5 Protect public safety and health
- O6 Prevent catastrophic infrastructure failures
- O7 Maintain or restore the intended infrastructure function
- O8 Prevent or reduce flooding
- O9 Protect infrastructure
- O10 Meet public expectations for aesthetics

Practices

Practices are the best management practices necessary to meet the water quality outcomes for each activity. Practices were compiled from other agencies' manuals, the NPDES stormwater management program, previous Clark County Public Works work practices, or from regulatory requirements.

The practices listed for each activity may be more thoroughly described in separate chapters about BMPs or in other agencies' manuals. The source manuals are also a good reference for specific BMPs. For example, the King County manual is a good source for sediment and erosion control and the Ecology Stormwater Manual (February 1992) is the most complete source for all stormwater BMPs.

Where to Find More Information on Best Management Practices

This manual provides a quick reference of the specific and categories of BMPs that apply to Operations activities. It does not provide detailed description of each BMP. The supervisor or crew chief is referred to the source manuals for descriptions and diagrams of BMPs.

Further Work

The manual also includes areas where much further work will be required. These include:

- Training in the use of BMPs
- Developing a habitat conservation plan
- More detailed description of BMPs
- Updates of this manual
- Developing an integrated pest management plan
- Developing comprehensive road maintenance standards

Chapter 2. Stormwater Facility Operation and Maintenance

Stormwater facility maintenance is activities that care for storm drains. The include all of the pipes, catch basins, drywells, manholes, swales, retention/detention ponds, oil/water separators, etc. in urbanized areas and some subdivisions in rural areas. Storm sewer maintenance does not include roadside ditch maintenance, which is described as a road maintenance activity.

The storm sewer maintenance standards include complete operation and maintenance standards adopted by the Board of County Commissioners in July 2000 amendments to the Water Quality Ordinance.

Special Facilities Maintenance Requirements

This manual provides a set of minimum standards and practices for maintaining stormwater facilities. Manufactured stormwater facilities such as leaf compost filters and oil/water separators often have maintenance requirements and manuals specified or written by the manufacturer. Also, larger or more complex stormwater facilities may include specifications for maintenance and vegetation management that provide specific detail above this manual.

Manufacturer or Designer's Maintenance Manuals

Where the Public Works Director determines that manuals or plans provide equal or greater level of maintenance and water quality protection, they shall be followed by the owner. These individual maintenance plans, specifications, or manuals must be approved by the Public Works Director. Review of the manuals and plans should include a county engineer, senior maintenance staff and, if available, the manual preparer.

One of a Kind Facilities

The director may require development and implementation of a site-specific maintenance plan for complex or unusual facilities. The plan is required when the general provisions of this manual do not provide sufficient detail for inspection, maintenance, vegetation management, and repair practices to operate the facility.

Catch Basins and Inlets

Catch Basins trap sediment and some oils that can pollute water bodies. They need to be inspected and cleaned annually to remove accumulated sediment, fluids, and trash.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O7 Maintain or restore the intended infrastructure function
- O8 Prevent or reduce flooding
- O9 Protect infrastructure

Operation and Maintenance Practices

Inspection

Inspect catch basins at least once per year.

Periodically inspect the catch basin and surrounding areas for pollutants such as leaks from dumpsters, minor spills, and oil dumping. Act to have the pollutant source removed.

Cleaning

Clean catch basins when they become one third full to maintain sediment-trapping capacity. Catch basin and manhole cleaning should be performed in a manner that keeps removed sediment and water from being discharged back into the storm sewer.

Clean putrid materials from catch basins when discovered or reported.

Keep the inlet cleared of debris and litter.

Safety

Work inside underground structures requires special OSHA-required confined space equipment and procedures. The most practical option may be to contract with a sewer-cleaning contractor.

Materials Handling

Disposal of waste from maintenance of drainage facilities shall be conducted in accordance with federal, state, and local regulations, including the Minimum Functional Standards for Solid Waste Handling Chapter 173-304 WAC; guidelines for disposal of waste materials; and where appropriate, Dangerous Waste Regulations, Chapter 173-303 WAC.

Removed sediment must be disposed of in the garbage as solid waste. Water should be disposed of in a sanitary sewer after oils are removed using oil absorbent materials or other mechanical means. Used oil absorbents should be recycled or disposed according the manufacture's instructions.

Repairs

Repair any damages that prevent the catch basin from functioning as designed. An example is broken or missing outlet elbow.

Follow the practices described under the Activity: Installation, Repair and Replacement of Enclosed Drainage Systems.

Debris Barriers/Trash Racks

Trash racks are barred covers to pipe openings. They prevent large objects from entering pipes and keep pets and people out of pipes. In cases where there is fish migration, maintaining unblocked trash racks allows fish passage.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O5 Protect public safety and health
- O6 Prevent catastrophic infrastructure failures
- O7 Maintain or restore the intended infrastructure function
- O8 Prevent or reduce flooding
- O9 Protect infrastructure

Operation and Maintenance Practices

Inspection

Inspect trash racks at least once per year.

Cleaning

Clean trash racks when debris is plugging more than 20 percent of the openings or when obstructions to fish passage are created. Consult the Washington Department of Wildlife if in a fish-bearing drainageway.

Repairs

Immediately replace missing racks and missing bars.

Replace bars that are deteriorated to the point where they may be easily removed.

Bend bent bars back into position.

Follow the practices described under the Activity: Installation, Repair and Replacement of Enclosed Drainage Systems.

Energy Dissipaters

Energy dissipaters are critical for preventing erosion at storm drain outfalls. There are a variety of designs including wire gabion baskets, rock splash pads, trenches, and specially designed pools or manholes.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O7 Maintain or restore the intended "infrastructure function
- O8 Prevent or reduce flooding
- O9 Protect infrastructure

Operation and Maintenance Practices

Inspection

Inspect at least once per year.

Cleaning

Dispersion Trench:

Remove sediment from pipe when it reaches 20 percent of pipe diameter.

Repairs

Follow the practice described under the Activity: Installation, Repair and Replacement of Enclosed Drainage Systems.

Rock Pads:

Replace missing or moved rock to cover exposed soil and meet design standards.

Dispersion Trench:

Repair conditions that cause concentrated flow along the trench.

Clean pipe perforations when one half of them are plugged or if flows bypass or overflow the trench.

Manhole/Chamber.

When the structure deteriorates to one half its original size or it becomes structurally unsound, replace it to the design standards.

Fences, Gates, and Water Quality Signs

Stormwater facilities such as detention ponds or treatment wetlands often have fences to protect them from damage and keep children away from ponds or hazardous areas. Certain facilities such as biofiltration swales, approved under Chapter 13.29 CCC, are also required to have informational signs telling the public that the swale is a stormwater facility.

Outcomes

- O5 Protect public safety and health
- O7 Maintain or restore the intended 'infrastructure function
- O9 Protect infrastructure

Operation and Maintenance Practices

Inspection

Inspect fences, gates, and water quality signs when facilities are maintained.

Repairs

Repair any opening that allows entry into the facility.

Close any opening that allows access beneath a fence

Replace any missing gates.

Repair broken gate hinges or gates which do not close and lock properly.

Replace any missing signs or signs that have more than 20 percent unreadable surface. Signs are available from the Clark County Department of Community Development at 1408 Franklin St in Vancouver.

Repair sign posts that lean more than 8 inches off vertical.

Access Roads and Easements

Many stormwater facilities have access roads to bring in heavy equipment for facility maintenance. These roads should be maintained for inspection access and ease of equipment access.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O7 Maintain or restore the intended infrastructure function
- O10 Meet public expectations for aesthetics

Operation and Maintenance Practices

Inspection

Inspect once a year or when facilities are maintained.

Cleaning

Remove litter when mowing or litter accumulation exceeds one cubic foot (about one and a half five-gallon buckets) per 1,000 square feet.

Remove any debris that blocks roads or may damage tires.

Vegetation Management

Manage vegetation as for the rest of the facility. Trees and shrubs may be removed from access roads and easements if they block access for necessary maintenance or will prevent or harm intended stormwater facility function.

Repairs

Correct any bare or eroded soils by seeding or cover BMP.

Repair road surfaces when they may lead to erosion or limit equipment access.

Manholes

Manholes are large cylindrical vaults usually set at storm sewer pipe connections. Unless you have OSHA approved training and equipment, never enter a manhole. There is a considerable risk of poisonous gas and injury.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O7 Maintain or restore the intended infrastructure function
- O8 Prevent or reduce flooding
- O9 Protect infrastructure

Operation and Maintenance Practices

Inspection

Inspect the manhole once per year. Check the frame and lid for cracks and wear, such as rocking lids or lids moved by traffic.

Periodically inspect the manhole and surrounding areas for pollutants such as leaks from dumpsters, minor spills, and oil dumping. Take action to have the pollutant source removed.

Cleaning

Clean manholes when there is a blockage of a water flow path. Cleaning should be performed in a way that ensures removed sediment and water is not discharged back into the storm sewer.

Safety

Work inside underground structures requires special OSHA-required confined space equipment and procedures. The most practical option may be to contract with a sewer-cleaning contractor.

Materials Handling

Disposal of waste from maintenance of drainage facilities shall be conducted in accordance with federal, state, and local regulations, including the Minimum Functional Standards for Solid Waste Handling Chapter 173-304 WAC; guidelines for disposal of waste materials; and where appropriate, Dangerous Waste Regulations, Chapter 173-303 WAC.

Removed sediment must be disposed in the garbage as solid waste. Water should be disposed of in a sanitary sewer after oils are removed using oil absorbent materials or other mechanical means. Used oil absorbents should be recycled or disposed according to the manufacturer's instructions.

Repairs

Repair all security and access features so they are fully functional. This includes locking lids, covers, and ladder rungs.

Replace broken parts or lids that rock or are moved by traffic.

Follow the practice described under the Activity: Installation, Repair and Replacement of Enclosed Drainage Systems.

Oil/Water Separators and Buried Wet Vaults

An oil/water separator is an underground vault that treats stormwater by mechanically separating oil from water. The oil rises to the surface and floats on the water and sediment settles to the bottom. Buried wet vaults are similar to oil/water separators in that they are sub-surface vaults that separate sediment and floating materials from stormwater.

These facilities have special problems for maintenance and should be serviced by contractors. The main issues are working in confined spaces and properly handling any sludge and oil cleaned from vaults or oil/water separators.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O7 Maintain or restore the intended infrastructure function
- O9 Protect infrastructure

Operation and Maintenance Practices

Inspection

Periodically check stormwater flow out of the facility. It should be clear and not have a thick visible oil sheen.

Annually check for cracks large enough to let soil enter the vault, broken or defective plates and baffles, and crushed or damaged pipes.

Periodically inspect the surrounding areas for pollutants such as leaks from dumpsters, minor spills, and oil dumping. Take action to have the pollutant source removed.

Inspect water levels after an extended dry period to check for leakage.

Cleaning

Remove trash and litter from the vault, inlet and piping.

Remove oil when it reaches one-inch thickness.

Remove sediment when it accumulates to 6 inches depth.

Safety

Work inside underground structures requires special OSHA-required confined space equipment and procedures. The most practical option may be to contract with a sewer-cleaning contractor.

Material Handling

Disposal of waste from maintenance of drainage facilities shall be conducted in accordance with federal, state, and local regulations, including the Minimum Functional Standards for

Solid Waste Handling Chapter 173-304 WAC; guidelines for disposal of waste materials; and where appropriate, Dangerous Waste Regulations, Chapter 173-303 WAC.

Removed sediment must be disposed in the garbage as solid waste. Water should be disposed of in a sanitary sewer after oils are removed using oil absorbent materials or other mechanical means. Used oil absorbents should be recycled or disposed according to the manufacturer's instructions.

Repairs

Repair any cracked or defective plates or baffles. Cracks are repaired so that no cracks greater than ¼-inch are present. Repair any leaks that allow water levels to drop and cause oil to be washed from the unit.

Repair all security and access features so they are fully functional. This includes locking lids, covers, and ladder rungs.

Follow the practice described under the Activity: Installation, Repair and Replacement of Enclosed Drainage Systems.

StormFilter™ (Leaf Compost Filter)

The StormFilter is a patented system for treating stormwater. The systems have evolved during the last 10 years from very simple above ground filter beds to a variety of vault devices containing cylindrical filters filled with leaf compost pellets. StormFilter facilities consist of cartridges filled with one or a combination of media. Media can be selected to target pollutants specific to a particular site. The cartridges are housed in pre-cast or cast in place concrete vaults or in a steel catch basin configuration. Each configuration uses baffles to promote settling of solids and separation of oils and other floatable materials. The majority of pollutants are captured by the media and held in the cartridges. Some additional settling will occur in the inlet and cartridge bays of each vault. Most of the units in Clark County contain cartridges.

The manufacturer has a detailed maintenance manual for these facilities. That manual should be used. The following practices are general requirements.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O7 Maintain or restore the intended infrastructure function
- O9 Protect infrastructure

Operation and Maintenance Practices

Inspection

Inspect the StormFilter every six months. The inspection should determine sediment depth and the specific maintenance and repairs needed.

Annually check for cracks large enough to let soil enter the vault, broken or defective plates and baffles, and crushed or damaged pipes.

Periodically inspect the catch basin and surrounding areas for pollutants such as leaks from dumpsters, minor spills, and oil dumping. Take action to have the pollutant source removed.

Cleaning

Remove trash and litter from the vault, inlet and piping.

Remove sediment when it accumulates to 6 inches depth in settling chambers.

Remove sediment when it accumulates on filter media.

Safety

Work inside underground structures requires special OSHA-required confined space equipment and procedures. The most practical option may be to contract with a sewer-cleaning contractor.

Material Handling

Disposal of waste from maintenance of drainage facilities shall be conducted in accordance with federal, state, and local regulations, including the Minimum Functional Standards for Solid Waste Handling Chapter 173-304 WAC; guidelines for disposal of waste materials; and where appropriate, Dangerous Waste Regulations, Chapter 173-303 WAC.

Removed sediment must be disposed in the garbage as solid waste. Water should be disposed of in a sanitary sewer after oils; are removed using oil absorbent materials or other mechanical means. Used oil absorbents should be recycled or disposed according to the manufacturer's instructions.

Return used compost or canisters to the manufacturer for proper disposal or dispose of them in the garbage as solid waste.

Repairs

Repair any cracked or defective plates or baffles. Cracks are repaired so that no cracks greater than ¼-inch are found.

Replace media cartridges if it takes longer than an hour for water to empty through media or if water frequently overflows the treatment chamber. Replace defective cartridges.

Repair all security and access features so they are fully functional. This includes locking manhole lids, covers, and ladder rungs.

Follow the practice described under the Activity: Installation, Repair and Replacement of Enclosed Drainage Systems.

Catch Basin Inserts

Catch basin inserts are becoming more widely used to trap sediment and oil entering catch basins. Most involve some type of filter media and oil-absorbent pads. Filters avoid flooding by overflowing when they become clogged or there are high storm flows.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O7 Maintain or restore the intended infrastructure function
- O9 Protect infrastructure

Operation and Maintenance Practices

Inspection

Inspect following the manufacturer's specifications. During the wet season (October through April), inserts should be inspected once every two weeks. Two-week inspection can determine if a longer inspection interval is appropriate at a specific site. During the dry season, inspect them at least every two months.

If inserts are used for trapping sediment on a construction project, they should be inspected after every major storm.

Periodically inspect the catch basin and surrounding areas for pollutants such as leaks from dumpsters, minor spills, and oil dumping. Take action to have the pollutant source removed.

Cleaning

Generally, the filter media is removed, then cleaned or disposed. It is easier to remove the filter after it has drained and dried. If this is not possible, consider contracting the service or de-watering the filter in a container.

Remove trash and litter from the filter.

If discharges have an oily sheen, replace the oil-trapping media. If the oil trapping media is full, remove it and replace it with a new one or if manufacturer's specifications allow, clean and replace it.

If sediment clogs media, clean it following manufacturer's specifications or replace the filter.

Material Handling

Persons handling used filters should wear rubber gloves and safety protection.

Disposal of waste from maintenance of drainage facilities shall be conducted in accordance with federal, state, and local regulations, including the Minimum Functional Standards for Solid Waste Handling Chapter 173-304 WAC; guidelines for disposal of waste materials; and where appropriate, Dangerous Waste Regulations, Chapter 173-303 WAC.

Removed sediment must be handled and disposed of in the garbage as solid waste. Water should be disposed of in a sanitary sewer after oils are removed using oil absorbent materials or other mechanical means. Used oil absorbents should be recycled or disposed according to the manufacturer's instructions.

Repairs

Replace any media after typical service life.

Stormwater Biofiltration Swales

Biofiltration swales use grass or other dense vegetation to filter sediment and oily materials out of stormwater. Usually they look like flat-bottomed channels with grass growing in them. Swales are stormwater treatment devices that must be properly maintained to sustain pollutant removal capacity.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O7 Maintain or restore the intended infrastructure function
- O10 Meet public expectations for aesthetics

Operation and Maintenance Practices

Inspection

Swales are easy to inspect and need to be well maintained to treat stormwater. Make frequent visual inspections for problems such as channeling flow, rills, bare ground, sediment and oily material.

Identify and remove pollutant sources discharging to the swale.

Cleaning

Clear inlets and outlets to prevent blockage.

Remove litter when mowing or litter accumulation exceeds one cubic foot (about one and a half five-gallon buckets)

Use a rake and shovel to hand remove sediment accumulations greater than 2 inches thick that cover grass areas, avoiding vegetation removal.

Vegetation Management

Mow to keep grass at the optimum height (6 inches). Mow to no less than 4 inches height and a minimum of four cuttings per year.

Remove clippings from the treatment area in the base of the swale. Clippings may be raked or blown onto the side slopes. If the swale has vertical walls or no side-slopes, the clippings must be removed.

Preserve healthy vegetation or reestablish vegetation where needed. Seed bare spots.

Use cover BMPs on bare soils. BMPs include hydroseeding or mulches.

Trees and shrubbery should be allowed to grow unless they interfere with facility function or maintenance activities. Any cut trees should be salvaged for habitat enhancement or converted to mulch or firewood.

Stormwater control facilities are, in effect, water body buffers where pesticides and fertilizer are not used. See Vegetation Management in Stormwater Control Facilities for more information.

Repairs

Often swales have problems due to flooding or erosion. Where possible, correct the underlying problem before trying to repair the symptom.

Level spreaders must be in proper working order for swales to function properly. Where level spreaders are damaged, sunken, or bypassed by erosion, repair them to design standard.

If there is a problem with grass dying due to the swale being flooded during the wet season, there are two options: convert the swale to plant varieties that can stand being flooded or find a way to fix the swale so it drains better. Call the Public Works Department at 397-6118, extension 4094 for information on plants and possible swale modifications.

Wet Biofiltration Swales and Treatment Wetlands

Wet biofiltration swales and treatment wetlands use dense wetland vegetation and settling to filter sediment and oily materials out of stormwater. These stormwater treatment devices must be properly maintained to sustain pollutant removal capacity. In some cases, biofiltration swales that were designed to drain between storms remain wet and need to be rebuilt or converted to wetland swales. A designed wet biofiltration swale uses wetland plants instead of grass.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O7 Maintain or restore the intended infrastructure function
- O10 Meet public expectations for aesthetics

Operation and Maintenance Practices

Inspection

Swales are easy to inspect and need to be well maintained to treat stormwater. Make frequent visual inspections for problems such as bare ground, sediment and oily material.

Identify and remove pollutant sources to the swale.

Cleaning

Clear inlets and outlets to prevent blockage.

Remove litter and trash when accumulation exceeds one cubic foot (about one and a half, five gallon buckets) per thousand square feet.

Where possible, use a rake and shovel to hand remove sediment accumulations greater than 2 inches thick in 10 percent of the treatment area.

Vegetation Management

Sparse vegetation or dense clumps of cattail do not properly treat stormwater. Try to find the cause of the problem and fix it to ensure dense vegetation. Cut back excessive cattail shoots. Normally, wetland vegetation does not need to be harvested unless there is an excessive die back that causes water quality problems.

If there is a problem with grass dying due to the swale being flooded during the wet season, there are two options: plant varieties that can stand being flooded or find a way to fix the swale so it drains better. Call the Public Works Department at 397-6118, extension 4094 for information on plants and possible swale modifications.

Outside of the treatment area, preserve healthy vegetation or reestablish vegetation where needed. Seed bare spots. Use cover BMPs on bare soils.

Trees and shrubbery should be allowed to grow unless they interfere with facility function or maintenance activities. Any cut trees should be salvaged for habitat enhancement or converted to mulch or firewood.

Stormwater control facilities are, in effect, water body buffers where pesticides and fertilizer are not used. See Vegetation Management in Stormwater Control Facilities for more information.

Repairs

Often swales have problems due to flooding or erosion. Where possible, correct the underlying problem before trying to repair the symptom.

Repair any defect that causes the wet swale to dry out during the wet season.

Replace stormwater facility signs that are broken, damaged, or stolen.

Filter Strips

Filter strips are linear strips of grass that remove sediment and oils from stormwater by filtering it. Stormwater is treated as it runs across the filter. Usually, filter strips are placed along the edge linear paved areas such as parking lots and roads. Where designed filter strips are installed; road shoulders should only be graded to maintain level flow off the road.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O7 Maintain or restore the intended infrastructure function
- O10 Meet public expectations for aesthetics

Operation and Maintenance Practices

Inspection

Filter strips are easy to inspect and need to be well maintained to treat stormwater. Make frequent visual inspections for problems such as bare ground, sediment and oily material.

Identify and remove pollutant sources.

Cleaning

Clear inlets and outlets to prevent blockage.

Remove litter when mowing or litter accumulates.

Use a rake and shovel to hand remove sediment accumulations greater than 2 inches thick that cover grass areas, avoiding vegetation removal. Remove sediment to re-level the slope to an even surface so that water spreads and does not form channels.

Vegetation Management

Mow to keep grass at the optimum height (6 inches). Mow to no less than 4 inches height and a minimum of four cuttings per year.

Remove clippings from the treatment area. They may be spread elsewhere on site where they will not reenter the stormwater facility.

Preserve healthy vegetation or reestablish vegetation where needed. Seed bare spots.

Use cover BMPs on bare soils.

Stormwater control facilities are, in effect, water body buffers where pesticides and fertilizer are not used. See Vegetation Management in Stormwater Control Facilities for details.

Repairs

Where possible, correct the underlying problem before trying to repair the symptom.

The flow spreader must be level and spread flow evenly across the filter. Immediately repair any defects in the flow spreader.

If ruts develop, fill them with coarse soil, level the surface and reseed.

Sand Filters

Sand filters treat stormwater by filtering it through a bed of sand into an under-drain beneath the sand. They are effective at removing pollutants but must be carefully designed and well maintained. Sand filters may have serious maintenance problems in sites with excessive sediment. Along with normal maintenance, the filter media needs replacement periodically. Consult engineer's operation manual written for the sand filter or have a licensed professional engineer assist in media replacement.

Sand filters are either above ground and open to view or below ground in vaults. Above ground filters are much easier to maintain. Below ground units require special training and equipment approved by OSHA for any work.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O7 Maintain or restore the intended infrastructure function
- O10 Meet public expectations for aesthetics

Operation and Maintenance Practices

Inspection

Above ground filters are easy to inspect and need to be well maintained to treat stormwater. Make frequent visual inspections for problems such as overtopping or bypasses, taking longer than 24 hours to draw down, and channels. Make a complete inspection of all features at least once a year.

Underground units must be inspected for all features at least once per year. More frequent inspections should be performed as a part of routine site maintenance. Check for indicators that the facility is not functioning. Examples include checking stormwater effluent for oil sheen, checking for overflowing, and checking for short circuiting.

Identify and remove pollutant sources.

Cleaning

Clean out accumulated sediment when it accumulates to 1/2 inch depth.

Remove any trash or litter from the sand bed and other parts of the facility. Rake up and remove accumulations of leaves or other plant debris that wash into the facility and begin to form a mat.

Clean sediment out of pre-settling chambers when 6 inches of sediment accumulates.

Clean out any drain pipes or clean outs that become filled with sediment.

Vegetation Management

Above ground sand filters may, or may not be designed with a vegetation surface. If a facility has vegetation, follow the maintenance procedures for a stormwater biofiltration swale.

If it does not have designed vegetation, mechanically remove vegetation before it begins to cover parts of the facility.

Remove all clippings or pulled weeds from the facility.

Safety

Work inside underground structures requires special OSHA-required confined space equipment and procedures. The most practical option may be to contract with a sewer-cleaning contractor.

Material Handling

Disposal of waste from maintenance of drainage facilities shall be conducted in accordance with federal, state, and local regulations, including the Minimum Functional Standards for Solid Waste Handling Chapter 173-304 WAC; guidelines for disposal of waste materials; and where appropriate, Dangerous Waste Regulations, Chapter 173-303 WAC.

Removed sediment must be disposed in the garbage as solid waste. Water should be disposed of in a sanitary sewer after oils are removed using oil absorbent materials or other mechanical means. Used oil absorbents should be recycled or disposed according to the manufacturer's instructions.

Repairs

Where possible, correct the underlying problem before trying to repair the symptom.

If it takes more than 24 hours for a storm to drain through the sand media or it frequently overflows, the sand media needs to be serviced. This problem is caused by fine particles clogging the sand filter. Have a licensed professional engineer oversee this procedure. At the very least, the upper few inches will need to be replaced. Sieve analyses may be helpful for determining the depth that needs to be removed and replaced with new sand. Replace clogged sand with the type of sand specified by the designer or approved by a Public Works Department Engineer.

If there are prolonged, low-rate flows into the facility due to groundwater seeps or detention facilities, route them to a smaller part of the facility using a low wood divider or shallow channel.

The flow spreader must be level and distribute flow evenly across the filter. Immediately repair any defects in the flow spreader.

If parts of the sand filter erode, find ways to correct the problem by compacting the sand or protecting the eroding area with geotextile or other means.

Replace or repair any damaged pipes.

Repair any cracked or defective plates or baffles. Cracks are repaired so that no cracks greater than ¼-inch are found.

Repair any joints that are cracked and allow soil into the facility.

Repair all security and access features so they are fully functional. This includes locking lids, covers, and ladder rungs.

Follow the practice described under the Activity: Installation, Repair and Replacement of Enclosed Drainage Systems.

Detention Ponds

Detention facilities are designed to hold and slowly release stormwater by use of a pond and specially designed control structure. Styles vary greatly from well manicured to natural appearing. Generally, more natural-appearing vegetation is preferred for reduced maintenance and wildlife habitat. Some facilities are designed to appear as natural water bodies or are in park-like areas.

Some older facilities are built in stream channels and require special permits such as an HPA from the Washington Department of Fish and Wildlife.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O3 Avoid or minimize vegetation removal
- O7 Maintain or restore the intended infrastructure function
- O8 Prevent or reduce flooding
- O10 Meet public expectations for aesthetics

Operation and Maintenance Practices

Inspection

Identify and report pollutant sources to the facility. Inspect the facility for oil and other pollutants and remove any pollutants greater in volume than a surface sheen.

Cleaning

Trash is removed when it exceeds 1 cubic foot per 1000 square feet.

Remove sediment when it accumulates to 10 percent designed pond depth.

Cleaning or excavating stormwater facilities within natural or altered streams will likely require an HPA from WDFW. Work within seasonally dry or ditched watercourses (e.g., Curtin Creek, China Ditch, etc.) may also require an HPA. Consult the official state DNR water type maps for assistance in determining whether watercourses are typed streams (e.g., type 1, 2,3,4 or 5) that are regulated by WDFW. Contact WDFW Region Five office for additional information on whether specific watercourses are regulated under the State Hydraulic Code, or if unmapped streams are encountered.

If there is an emergency (e.g., immediate threat to life or property, or threat of environmental degradation), a verbal HPA may be obtained by calling the Washington Department of Fish and Wildlife Region Five Vancouver Office (360) 696-6211, or the Statewide Emergency Hotline HPA Hotline (360) 902-2537.

Material Handling

Disposal of waste from maintenance of drainage facilities shall be conducted in accordance with federal, state, and local regulations, including the Minimum Functional Standards for Solid Waste Handling Chapter 173-304 WAC; guidelines for disposal of waste materials; and where appropriate, Dangerous Waste Regulations, Chapter 173-303 WAC.

Vegetation Management

Where a facility has natural area, vegetation management should be timed to avoid or minimize impacts on wildlife. An example is facilities used by breeding birds such as red-winged black birds.

Mow or control vegetation to match surrounding area or sustain any other intended use of the facility, such as wildlife habitat or recreation.

Stormwater control facilities are, in effect, water body buffers in which pesticides and fertilizer are not used.

Use mechanical methods to control weeds. Pesticides, herbicides and fertilizers are not used in stormwater control facilities. See the activity: Vegetation Management in Stormwater Control Facilities for more information.

When replacing plantings, use only plants on the list of adopted Clark County Plant List (Ordinance. 1995-01-26) or Vancouver plant list inside Vancouver.

Trees should not be allowed to grow on emergency overflows and berms that are over 4 feet high. Trees can block flows and roots can lead to berm failure. Remove any trees. Remove larger roots (where the base of the tree is greater than 4 inches) and restore the berm.

Trees and shrubbery should be allowed to grow unless they interfere with facility function or maintenance activities. Any cut trees should be salvaged for habitat enhancement or converted to mulch or firewood.

Repairs

Repair and seed bare areas. Repair eroded slopes when rills form, where the cause of damage is present, or there is potential for future erosion. Use cover BMPs on exposed soils.

Level spreaders must be in proper working order to function properly. Where level spreaders are damaged, sunken, or bypassed by erosion, repair them to design standard.

Rodent holes on a dam or berm can pipe water. Destroy the rodents, preferably by trapping, and repair the darn or berm. Check with the Washington Department of Fish and Wildlife before removing a game animal or far-bearer, for example muskrat, beaver, and nutria.

Repair the liner if it is visible and repair or replace where there are more than three holes greater than ¼-inch diameter.

If berms or dams show signs of settlement or sinkholes, serious problems may be occurring. Consult a licensed professional engineer to determine the cause of the settlement or sinkhole.

Spillway areas should be completely covered by more than one layer of rock.

Drywells

Drywells are perforated, open-bottomed manholes used to infiltrate stormwater into the ground. While not the intended use, drywells trap sediment and some of the oily pollutants in runoff. Drywells are more likely to fill with oily sediment in areas that lack swales or other treatment facilities. Fine oil sediment can clog drywells and lead to localized street flooding. Also, pollutants discharged into drywells can migrate into groundwater. Drywells were often installed in closed topographic depressions, areas with well-drained soils, or areas having inadequate storm sewers. Often, drywells contain groundwater.

Because drywells can be easily clogged and tend to concentrate pollutants in one place; pollution and sediment control practices should be used to protect them.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O7 Maintain or restore the intended infrastructure function
- O8 Prevent or reduce flooding
- O9 Protect infrastructure

Operation and Maintenance Practices

Inspection

Drywells should be inspected at least once a year and no less than once every five years.

Periodically inspect the drywell and surrounding areas for pollutants such as leaks from dumpsters, minor spills, and oil dumping. Take action to have the pollutant source removed.

If a problem with flooding or slow drainage occurs, observe or inspect the drywell for infiltration rate and observe water level depths if monitoring wells are installed.

Cleaning

Clean out drywells when sediment depth is greater than 1/3 of the distance between the base and inlet pipe.

Drywell cleaning should be performed in a way that makes certain removed sediment and water is not discharged back into the storm sewer.

Safety

Work inside underground structures requires special OSHA-required confined space equipment and procedures. The most practical option may be to contract with a sewer-cleaning contractor.

Material Handling

Disposal of waste from maintenance of drainage facilities shall be conducted in accordance with federal, state, and local regulations, including the Minimum Functional Standards for Solid Waste Handling Chapter 173-304 WAC; guidelines for disposal of waste materials; and where appropriate, Dangerous Waste Regulations, Chapter 173-303 WAC.

Removed sediment must be disposed in the garbage as solid waste. Water should be disposed of in a sanitary sewer after oils are removed using oil absorbent materials or other mechanical means. Used oil absorbents should be recycled or disposed according to the manufacturer's instructions.

Repairs

Work in drywells requires special OSHA-required confined space equipment and procedures. The most practical method for cleaning drywells may be to contract with a sewer-cleaning contractor.

If the drywell does not dissipate stormwater, it should be replaced or repaired.

It is possible to restore some drywell capacity by water-jetting clogged openings.

Another option is installing a new drywell or drainage trench, and converting the clogged drywell into a sediment trap. This has the advantage of providing a sediment trap and some amount of spill trapping. The sediment trap conversion requires grouting the holes, covering the base with concrete, and adding piping.

If there is standing water in a drywell, it probably is into the water table. Drywells in the water table should be rebuilt to prevent stormwater from going directly into groundwater.

Repair all security and access features so they are fully functional. This includes locking lids, covers, and ladder rungs.

Follow the practice described under the Activity: Installation, Repair and Replacement of Enclosed Drainage Systems.

Drainage Trenches

Drainage trenches are subsurface gravel-lined drain fields built to infiltrate stormwater into the ground. They have a large, perforated pipe in a bed of sorted gravel. Fine, oily sediment can clog drainfields and lead to localized street flooding. Also, pollutants discharged into drainfield can migrate into groundwater. Drainage trenches were often installed in closed topographic depressions, areas with well-drained soils, or areas having inadequate storm sewers.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O7 Maintain or restore the intended infrastructure function
- O8 Prevent or reduce flooding
- O9 Protect infrastructure

Operation and Maintenance Practices

Inspection

Some drainage trenches have special inspection wells or clean out manholes. They should be inspected at once a year and no less than once every five years.

A thorough inspection of the observation points should be made if there is a decrease in capacity. Inspection points can include: inspection ports, monitoring ports built into the trench, and water table depth monitoring wells. Water levels in these inspection points can provide information about the performance of the facility.

If there is a problem with flooding or slow drainage, the facility design rate needs to be verified. If there are monitoring tubes in the drain field, use them to observe infiltration rates.

Periodically inspect the surrounding areas for pollutants such as leaks from dumpsters, minor spills, and oil dumping. Take action to have the pollutant source removed.

Cleaning

If a drainage trench begins to clog, try cleaning the perforated drainpipe.

Cleaning should be performed in a way that makes certain removed sediment and water is not discharged back into the storm sewer.

Safety

Work inside underground structures requires special OSHA-required confined space equipment and procedures. The most practical option may be to contract with a sewer-cleaning contractor.

Material Handling

Disposal of waste from maintenance of drainage facilities shall be conducted in accordance with federal, state, and local regulations, including the Minimum Functional Standards for Solid Waste

Handling Chapter 173-304 WAC; guidelines for disposal of waste materials; and where appropriate, Dangerous Waste Regulations, Chapter 173-303 WAC.

Removed sediment must be disposed in the garbage as solid waste. Water should be disposed of in a sanitary sewer after oils are removed using oil absorbent materials or other mechanical means. Used oil absorbents should be recycled or disposed according the manufacturer's instructions.

Repairs

Repairing a clogged drainage trench will involve excavation and replacement of part or all of the facility.

Follow the practice described under the Activity: Installation, Repair and Replacement of Enclosed Drainage Systems.

Infiltration Basins/Ponds

Infiltration facilities dispose of water by holding it in an area where it can soak into the ground. These are open facilities that may either drain rapidly and have grass bases, or have perpetual ponds where water levels rise and fall with stormwater flows. Infiltration facilities may be designed to handle all of the runoff from an area or they may overflow and bypass larger storms.

Since the facility is design to pass water into the ground, anything that can cause the base to clog will reduce performance and is a large concern. Generally, infiltration basins are managed like detention ponds but with greater emphasis on maintaining the capacity to infiltrate stormwater.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O3 Avoid or minimize vegetation removal
- O7 Maintain or restore the intended infrastructure function
- O8 Prevent or reduce flooding
- O10 Meet public expectations for aesthetics

Operation and Maintenance Practices

Inspection

Check once per year after a rainstorm to see if the facility is draining as intended. Inspect annually for all features.

A thorough inspection of the observation points should be made if there is a decrease in retention basin capacity. Inspection points can include monitoring ports built into the base of the facility and water table depth monitoring wells. Water levels in these inspection points can provide information about the performance of the facility. It will probably require a licensed professional engineer or other professional trained in hydraulics to interpret the information.

Identify and remove pollutant sources to the facility. Inspect the facility for oil and other pollutants and remove any pollutants greater in volume than a surface sheen.

Cleaning

Trash is removed when it exceeds 1 cubic foot per 1000 square feet.

Remove sediment when it accumulates to 2 inches or if the facility does not drain between storms or meet 90 percent of design capabilities.

If the facility has a sediment trap, clean out the sediment when one-half foot accumulates.

Materials Handling

Disposal of waste from maintenance of drainage facilities shall be conducted in accordance with federal, state, and local regulations, including the Minimum Functional Standards for Solid Waste Handling Chapter 173-304 WAC; guidelines for disposal of waste materials; and where appropriate, Dangerous Waste Regulations, Chapter 173-303 WAC.

Vegetation Management

Mow or control vegetation to match surrounding area or sustain any other intended use of the facility, such as wildlife habitat or recreation.

Stormwater control facilities are, in effect, water body buffers where pesticides and fertilizer are not normally used. See the activity Vegetation Management in Stormwater Control Facilities for details.

Use mechanical methods to control weeds. Pesticides, herbicides and fertilizers are not normally used in stormwater control facilities.

When replacing plantings, use only plants on the list of adopted Clark County Plant List (Ordinance. 1995-01-26) or Vancouver plant list inside Vancouver.

Trees should not be allowed to grow on emergency overflows and berms that are over 4 feet high. Trees can block flows and roots can lead to berm failure. Remove any trees. Remove larger roots (where the base of the tree is greater than 4 inches) and restore the berm.

Trees and shrubbery should be allowed to grow unless they interfere with facility function or maintenance activities. Any cut trees should be salvaged for habitat enhancement or converted to mulch or firewood.

Repairs

If the facility is overflowing for storms it was designed to infiltrate, it needs to be repaired. This requires removing accumulated sediment and cleaning or rebuilding the system so that it works according to design.

Repair and seed bare areas. Repair eroded slopes when rills form, where the cause of damage is still present, or there is potential for future erosion. Use cover BMPs on exposed soils.

Rodent holes on a darn or berm can pipe water. Destroy rodents, preferably by trapping, and repair the dam or berm. Check with the Washington Department of Fish and Wildlife before removing a game animal or fur-bearer, for example muskrat, beaver, nutria.

Spillway areas should be completely covered by more than one layer of rock.

Closed Detention Systems in Tanks or Vaults

Underground tanks or vaults usually are placed under paved areas. They are hold and slowly release stormwater runoff from roofs and pavement.

Tanks and vaults are confined spaces where work requires special OSHA approved training and equipment.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O7 Maintain or restore the intended infrastructure function
- O9 Protect infrastructure

Operation and Maintenance Practices

Inspection

Inspect annually for the features listed under Cleaning and Repairs.

Periodically inspect the facility and surrounding areas for pollutants such as leaks from dumpsters, minor spills, and oil dumping. Take action to have the pollutant source removed.

Cleaning

Remove trash and litter from the vault, inlet and piping.

Clean air vents that have one half of their area plugged.

Remove sediment when it accumulates to 1/10th the depth of a rectangular vault or 1/10th the diameter of a round tank or pipe.

Safety

Work inside underground structures requires special OSHA-required confined space equipment and procedures. The most practical option may be to contract with a sewer-cleaning contractor.

Material Handling

Disposal of waste from maintenance of drainage facilities shall be conducted in accordance with federal, state, and local regulations, including the Minimum Functional Standards for Solid Waste Handling Chapter 173-304 WAC; guidelines for disposal of waste materials; and where appropriate, Dangerous Waste Regulations, Chapter 173-303 WAC.

Removed sediment must be handled and disposed of in the garbage as solid waste. Water should be disposed of in a sanitary sewer after oils are removed using oil absorbent materials or other mechanical means. Used oil absorbents should be recycled or disposed according to the manufacturer's instructions.

Repairs

Repair any cracked or defective plates or baffles. Cracks are repaired so that no cracks greater than ¼-inch are found.

Any part of a tank or pipe that is bent out of shape more than 10 percent of its design shape must be replaced or repaired.

Repair any joints that are cracked and allow soil into the facility.

Repair all security and access features. This includes locking lids, covers, and ladder rungs.

Follow the practice described under the Activity: Installation, Repair and Replacement of Enclosed Drainage Systems.

Flow Control Structures/Flow Restrictors

Flow control structures and flow restrictors direct or restrict flow in or out of facility components. Outflow controls on detention facilities are a common example where flow control structures slowly release stormwater at a specific rate. If these flow controls are damaged, plugged, bypassed, or not working properly, the facility could overtop or be releasing water at too high of a rate. This will likely damage streams habitat and property. Site plans should have detailed drawings showing how the flow control structures should appear. Consult a licensed professional engineer for assistance.

Outcomes

- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O7 Maintain or restore the intended infrastructure function
- O9 Protect infrastructure

Operation and Maintenance Practices

Inspection

Inspect at least once per year for all features listed under Cleaning and Repairs, or when a facility does not drain properly or other problems occur.

Cleaning

Remove sediment within one and ½ feet of the bottom of an orifice plate.

Remove trash and debris that may block the orifice plate.

Remove any trash or debris that may block an overflow pipe-

Safety

Work inside underground structures requires special OSHA-required confined space equipment and procedures. The most practical option may be to contract with a sewer-cleaning contractor.

Material Handling

Disposal of waste from maintenance of drainage facilities shall be conducted in accordance with federal, state, and local regulations, including the Minimum Functional Standards for Solid Waste Handling Chapter 173-304WAC; guidelines for disposal of waste materials; and where appropriate, Dangerous Waste Regulations, Chapter 173-303 WAC.

Removed sediment must be disposed in the garbage as solid waste. Water should be disposed of in a sanitary sewer after oils are removed using oil absorbent materials or other mechanical means. Used oil absorbents should be recycled or disposed according to the manufacturer's instructions.

Repairs

Repair or replace to original design specification any outlet orifice that is enlarged, bypassed or damaged.

Make certain that overflow outlets are not blocked.

Structures should be securely in place and within 10 percent of vertical.

Repair outlet pipe structures that have leaking connections or holes not specified by the design.

Repair or replace a non-functional or damaged cleanout gate.

Repair or replace damaged orifice plates to original design specification.

No outflow controls can be modified without approval of a Clark County Public Works Department engineer. Modifications may require approval under the Chapter 13.29 Stormwater Controls.

Follow the practice described under the Activity: Installation, Repair and Replacement of Enclosed Drainage Systems.

Storm Pipe

Storm sewer pipes convey stormwater. Pipes are built from many materials and are sometimes perforated to allow stormwater to infiltrate into the ground. Storm pipes are cleaned to remove sediment or blockages when problems are identified. Storm pipes must be clear of obstructions and breaks to prevent localized flooding.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O7 Maintain or restore the intended infrastructure function
- O8 Prevent or reduce flooding
- O9 Protect infrastructure

Operation and Maintenance Practices

Inspection

Pipes are difficult to inspect, requiring special equipment and training. Usually, if a problem occurs the owner needs to call a sewer or plumbing contractor to inspect, repair or clean pipelines.

Cleaning

Clean pipes when sediment depth is greater than 20 percent of pipe diameter. When cleaning a pipe, minimize sediment and debris discharges from pipes to the storm sewer. Install downstream debris traps (where applicable) before cleaning and then remove material.

Generally, use mechanical methods to remove root obstructions from inside storm sewer pipes. Do not put root-dissolving chemicals in storm sewer pipes. If there is a problem, remove the vegetation over the line.

Cleaning or excavating a pipe or culvert within natural or altered streams will likely require an HPA from WDFW. Work within seasonally dry or ditched watercourses (e.g., Curtin Creek, China Ditch, etc.) may also require an HPA. Consult the official state DNR water type maps for assistance in determining whether watercourses are typed streams (e.g., type 1, 2, 3, 4 or 5) that are regulated by WDFW. Contact WDFW Region Five office for additional information on whether specific watercourses are regulated under the State Hydraulic Code, or if unmapped streams are encountered.

If there is an emergency (e.g., immediate threat to life or property, or threat of environmental degradation), a verbal HPA may be obtained by calling the Washington Department of Fish and Wildlife Region Five Vancouver Office (360) 696-6211, or the Statewide Emergency Hotline HPA Hotline (360) 902-2537.

Safety

Work inside underground structures requires special OSHA-required confined space equipment and procedures. The most practical option may be to contract with a sewer-cleaning contractor.

Materials Handling

Sediment and debris from pipes should be disposed in the garbage as solid waste. Pick out any rocks first.

Repairs

Repair or replace pipes when a dent or break closes more than 20 percent of the pipe diameter.

Repair or replace pipes damaged by rust or deterioration.

Follow the practice described under the Activity: Installation, Repair and Replacement of Enclosed Drainage Systems.

Dry Drainage Ditches

Ditches are manmade open channels that carry only stormwater. This does not include ditches that have water flowing in them during dry weather.

Ditches are often maintained for drainage to prevent localized flooding by draining stormwater. Maintenance includes removing sediment, debris and overgrown vegetation.

Protecting water quality dictates minimizing vegetation removal and preventing erosion.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O3 Avoid or minimize vegetation removal
- O4 Preserve native plants
- O7 Maintain or restore the intended infrastructure function
- O8 Prevent or reduce flooding
- O9 Protect infrastructure

Operation and Maintenance Practices

Inspection

Inspect ditches during routine site maintenance or at least once per year.

Cleaning

Land disturbing activities that remove vegetation or disturb soil are subject to erosion control requirements of Chapter 13.29 Stormwater Controls. A good time to clean is during the growing season, when it's easiest to reestablish vegetation. This is generally April through June and September through October.

Cleaning or excavating stormwater facilities within natural or altered streams will likely require an HPA from WDFW. Work within seasonally dry or ditched watercourses (e.g., Curtin Creek, China Ditch, etc.) may also require an HPA. Consult the official state DNR water type maps for assistance in determining whether watercourses are typed streams (e.g., type 1, 2, 3, 4 or 5) that are regulated by WDFW. Contact VTDFW Region Five office for additional information on whether specific watercourses are regulated under the State Hydraulic Code, or if unmapped streams are encountered.

If there is an emergency (e.g., immediate threat to life or property, or threat of environmental degradation), a verbal HPA may be obtained by calling the Washington Department of Fish and Wildlife Region Five Vancouver Office (360) 696-6211, or the Statewide Emergency Hotline HPA Hotline (360) 902-2537.

If feasible, remove small amounts of sediment by hand when performing routine site maintenance.

Vegetation should only be removed when it reduces free movement of water through the ditch. Never remove more vegetation than is absolutely needed.

Only remove sediment when it reaches 20 percent of the ditch depth or affects the historic or designed hydraulic capacity.

Alternate cleaning areas with undisturbed areas, leaving undisturbed sections to act as sediment-trapping filters between worked areas.

Trap sediment that is generated by ditch maintenance to keep it from entering water bodies. Use sediment-trapping BMPs such as fabric fencing or filter bags at the lower end of each excavated area

Prevent sediment from eroding when ditch work is performed. Perform work during dry weather unless there is an emergency such as property or road flooding.

Vegetate bare soils by hydroseeding or cover bare soils with an approved BMP. Hand seed for smaller areas.

Water-Bearing (base flow) Drainage Ditches

Many manmade drainage ditches carry water when it is not raining. This water comes from groundwater seeps and wetlands. These ditches can be recognized by the presence of wetland plants such as cattails. Any work that disturbs these channels is probably subject to a variety of environmental regulations and will probably require an HPA permit from the Washington Department of Fish and Wildlife.

Water-bearing drainage ditches require permits for work. Requirements of county, state, and federal laws and permits may apply. Contact the Washington Department of Fish and Wildlife and the Clark County Department of Community Development before beginning work.

Installation, Repair and Replacement of Enclosed Drainage Systems

This activity includes tasks such as repair and replacement of pipe, catch basins, drywells and manholes. It also includes drainage projects that add new pipes, catch basins, or infiltration structures. New drainage projects are subject to regulations under Chapter 13.29 Stormwater Controls. Source control BMPs are required for activities such as concrete cutting.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming Pollutant sources
- O7 Maintain or restore the intended infrastructure function
- O8 Prevent or reduce flooding

Practices

Avoid or minimize vegetation removal. If work is near a stream or wetland, there are regulatory requirements under Chapter 13.36 Wetlands Protection or Chapter 13.51 Habitat Conservation.

Follow any construction permit requirements of the Stormwater Control Ordinance, Chapter 13.29 CCC.

If work is performed under contract, specify BMP performance under inspection/contract administration.

Prevent debris, oils, cleaning agents, and sediment from entering waterways.

Avoid or minimize work in wet weather. This will reduce the problems of containing sediment.

Carry spill control kit to contain and clean up possible small spills in the work area.

Protect storm drains.

- Cover storm sewer inlets, catch basins and open manholes to block sediment-bearing water.
- If runoff contains sediment, use gravel-filled filter bags or an equivalent product to build berms around inlets. Gravel-filled bags are more stable than chip-filled bags.
- Catch basin inserts are also an acceptable sediment trapping option.

At stream crossings, trap materials using screens or another form of containment. Use containment BMPs to protect roadside ditches during wet weather.

Avoid using water to clean up work sites. Sweep or vacuum dust and debris from the repair job. Do not wash materials into storm sewers.

Place stockpiles away from drainage ways, wetlands, and natural wetland and habitat buffers. Cover stockpiles or contain them with berms or other containment devices if there is a chance that materials will erode into a storm drain or water body.

Cleaning or excavating a stormwater facility within natural or altered streams will likely require an HPA from WDFW. Work within seasonally dry or ditched watercourses (e.g., Curtin Creek, China Ditch, etc.) may also require an HPA. Consult the official state DNR water type maps for assistance in determining whether watercourses are typed streams (e.g., type 1, 2, 3, 4 or 5) that are regulated by WDFW. Contact WDFW Region Five office for additional information on whether specific watercourses are regulated under the State Hydraulic Code, or if unmapped streams are encountered.

If there is an emergency (e.g., immediate threat to life or property, or threat of environmental degradation), a verbal HPA may be obtained by calling the Washington Department of Fish and Wildlife Region Five Vancouver Office (360) 696-6211, or the Statewide Emergency Hotline HPA Hotline (360) 902-2537.

Minor Culvert Repair (not in a stream)

This activity is the replacement or repair of culverts and inlets less than 6 feet in diameter. It applies only to structures that are in ditches but specifically for drainage that do not carry water during dry weather. If there is any question about whether the ditch is a storm drain or a stream consult, with the Washington Department of Fish and Wildlife.

Outcomes

- O1 Avoid or minimize sediment and pollutant discharges from the work area
- O3 Avoid or minimize vegetation removal
- O7 Maintain or restore the intended infrastructure function
- O8 Prevent or reduce flooding
- O9 Protect infrastructure

Maintenance Practices

Comply with stormwater and erosion control requirements of Chapter 13.29 Stormwater Controls.

Avoid or minimize vegetation removal. If work is near a stream or wetland, there are likely regulatory requirements under Chapter 13.36 Wetlands Protection or Chapter 13.51 Habitat Conservation.

Other than to address a threat to public safety or property due to flooding, perform work during the dry season.

Minimize soil disturbance.

Use sediment controls to trap any sediment and prevent sediment from entering storm sewer and water bodies. Sediment trapping BMPs are used to the extent practical during emergencies.

Use cover BMPs to prevent erosion of bare soil. Vegetate bare soils.

Cleaning or excavating a stormwater facility within natural or altered streams will likely require an HPA from WDFW. Work within seasonally dry or ditched watercourses (e.g., Curtin Creek, China Ditch, etc.) may also require an HPA. Consult the official state DNR water type maps for assistance in determining whether watercourses are typed streams (e.g., type 1, 2, 3, 4 or 5) that are regulated by WDFW. Contact WDFW Region Five office for additional information on whether specific watercourses are regulated under the State Hydraulic Code, or if unmapped streams are encountered.

If there is an emergency (e.g., immediate threat to life or property, or threat of environmental degradation), a verbal HPA may be obtained by calling the Washington Department of Fish and Wildlife Region Five Vancouver Office (360) 696-6211, or the Statewide Emergency Hotline (360) 902-2537.

Major Culvert Repair (At a Stream Crossing)

This activity is the replacement or repair of culverts and inlets greater than 6 feet 'in diameter or bridging a stream or ditch with flowing water during dry weather. If there is any question about whether the ditch is a storm drain or a stream consult with the Washington Department of Fish and Wildlife and the Clark County Department of Community Development.

These projects must meet all regulatory requirements.

- SEPA
- Shoreline Management
- State HPA
- Flood Plain

Pavement Sweeping

Sweeping is performed to remove sand and litter from streets and curb gutters. Sweeping also reduces dust during dry weather. Street sweeping is also storm sewer maintenance practice because it limits sediment washed into stormwater facilities. Water quality practices for street sweeping focus on sediment disposal. Reducing the amount of sediment washed into catch basins, detention facilities, drywells, and other facilities can save money because sweeping is generally cheaper than removing sediment from facilities. Sweeping also helps protect facilities from clogging with sediment.

Outcomes

- O2 Prevent parking areas, roads, drainage systems, facilities and property from becoming pollutant sources
- O5 Protect public safety and health
- O10 Meet public expectations for aesthetics

Practices

Sweep the site if it will help keep sediment and from storm sewers or water bodies. Sweeping is especially useful for cleaning up work areas.

Disposal of waste from maintenance of drainage facilities shall be conducted in accordance with federal, state, and local regulations, including the Minimum Functional Standards for Solid Waste Handling Chapter 173-304 WAC; guidelines for disposal of waste materials; and where appropriate, Dangerous Waste Regulations, Chapter 173-303 WAC.

Sweepings should be disposed of as solid waste or under a program permitted by the Southwest Washington Health District.

Chapter 3. Road Operation and Maintenance

Road maintenance activities include just routine maintenance activities on roads, roadsides and bridges or stream culverts. It includes activities such as sweeping, roadside vegetation management, ditch cleaning, clearing debris from culverts and de-icing.

The overall goal of water quality BMPs for road O and M is to make sure that:

- Systems that control pollutants, such as vegetation in roadside ditches are preserved
- Work on roads does not become a source of pollutants such as sediment.
- Activities near sensitive areas such as stream buffers and wetland buffers follow habitat protection procedures
- Sources of pollutants to roadside ditches are identified and removed.

Activity: Street Sweeping (vacuum pickup)

Street sweeping is performed largely for aesthetics and to remove sand and litter sediment from streets and curb gutters. Street sweeping is a water quality BMP. Water quality practices for street sweeping focus on sediment disposal.

Outcomes

- O2 Prevent county/city roads, drainage systems, facilities and property from becoming pollutant sources
- O5 Protect public safety and health
- O10 Meet public expectations for aesthetics

Practices

Subdivision streets are swept 9 times per year and arterial roads and collector roads are swept 12 times per year. Sweeping schedules may be revised following monitoring of the program.

Materials storage BMPs from the Stormwater Pollution Control Manual will be used for sweepings.

Sweepings are disposed as provided for by the Washington Department of Ecology and Southwest Washington Health District requirements. Sweepings are screened to separate litter and trash (disposed as solid waste), then used as reclamation fill in permitted county gravel pits.

Activity: Sweeping (non pick up)

This sweeping brushes debris off the road surface onto road shoulders and into the ditch sides.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O2 Prevent county/city roads, drainage systems, facilities and property from becoming pollutant sources
- O5 Protect public safety and health
- O10 Meet public expectations for aesthetics

Practices

Do not sweep debris into wet ditches (storm or base flow) or into streams, ponds, or wetlands.
Sweep debris into vegetated areas of shoulder or ditch.

Vacuum sweepers are used on bridges, and within 250 feet of water bodies, streams and wetlands.

Activity: Roadside Mowing

Mowing maintains sight distances, promotes grass growth and controls unwanted vegetation. It can include mowing of grass, brush and shrubbery.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O3 Minimize vegetation removal
- O4 Preserve native plants
- O5 Protect public safety and health
- O10 Meet public expectations for aesthetics

Practices

Perform mowing to the extent needed to control unwanted vegetation. Natural vegetation is left in place to the extent possible, considering safety issues for visibility and the need to maintain ditch flow capacity.

Minimize mowing to the backslope to include areas where noxious weeds or unwanted vegetation need to be controlled.

Roadside ditches are stormwater conveyances, and are in effect, water body buffers where pesticides and fertilizer are not normally used. See Activity: Vegetation and Pest Management in Stormwater Control Facilities for details.

The Weed Control Board spot sprays noxious weeds along roadsides under contract with the Public Works Department.

In Habitat Conservation Areas where roads abut natural vegetation (not cultivated fields, lawns and pastures), mowing is restricted to the road shoulder and for control of patches of blackberries or other noxious or nuisance vegetation.

Activity: Roadside Chemical Vegetation Control

Weed control is performed to control noxious weeds on county/city right-of-way and to kill vegetation along the edge of pavement along arterial roads and major collectors, within pavement cracks, and on landscaped medians. This activity does not include maintaining stormwater swales or other vegetated stormwater facilities.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O3 Minimize vegetation removal
- O4 Preserve native plants
- O5 Protect public safety and health
- O7 Maintain or restore the intended infrastructure function
- O10 Meet public expectations for aesthetics

Practices

Chemical controls are used where it is not practical to control by mechanical removal or cultural controls.

Herbicide is sprayed to either the top of the ditch or two feet from the edge of pavement (whichever is less) to control vegetation.

The Weed Management Department spot sprays noxious weeds along roadsides under contract with the Public Works Department. Other weeds are removed mechanically.

Never spray herbicides into water. Many roadside ditches carry water during dry periods and can be recognized by the presence of water and wetland plants such as cattails. Do not spray herbicide in these ditches.

Within 250 feet of a water body or wetland, or within a designated Habitat Conservation Areas, follow the practices of Activity: Vegetation and Pest Management in Stormwater Control Facilities or avoid chemical applications within 100 feet of a water body.

Activity: Roadside Brush and Tree Clearing

This includes mechanical, hand removal, and spot herbicide spraying of undesirable shrubs, bushes and trees along roads. Noxious weed control is by the Weed Management Department.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O3 Minimize vegetation removal
- O4 Preserve native plants
- O5 Protect public safety and health
- O9 Protect infrastructure
- O10 Meet public expectations for aesthetics

Practices

Limit brush removal to the shoulder and ditch. Only remove brush and trees or branches to provide sight distance and maintain ditch flow capacity.

Do not remove native shrubs or trees within Habitat Conservation Areas, wetland buffers, or along drainage ditches that have dry weather flow unless it poses a hazard or is a nuisance or noxious weed. These ditches often have wetland plants such as cattails in them. Consult with the area supervisor before removing trees or brush within 250 feet of a stream. The county habitat biologist should be consulted before removing trees in an Habitat Conservation Area. For drainage ditches, follow the practices of Activity: Vegetation and Pest Management in Stormwater Control Facilities. For other roadside areas with natural vegetation, follow vegetation management activity: Vegetation Management in Less-Managed Areas.

Only trees that pose a danger of falling onto roadways or structures may be removed within Habitat Conservation Areas. Removed trees are replaced with the same type of trees that cover an equal area as the canopy of the removed tree. Tree replacement is within the same basin.

If practical, hand remove weeds such as black berry vines, nightshade and scotch broom while keeping other bushes and trees.

If there is a water body or ditch with water flow during dry weather, only clear bushes when sight distance is an issue, and after checking with the area supervisor.

Cover bared soils with an erosion prevention cover BMP. Vegetate bare soils.

Activity: Brush and Tree clearing Near Bridges

This includes hand removal of undesirable shrubs, bushes and trees along bridge approaches and under bridges. Bridges over water bodies are always in Habitat Conservation Areas.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O3 Minimize vegetation removal
- O4 Preserve native plants
- O5 Protect public safety and health
- O7 Maintain or restore the intended infrastructure function
- O9 Protect infrastructure
- O10 Meet public expectations for aesthetics

Practices

Limit brush removal to area between the edge of pavement to the back side of the ditch or to a location that provides adequate sight distance.

If practical, hand remove weeds such as black berry vines, nightshade and scotch broom while keeping other bushes and trees.

Only trees that pose a danger of falling onto roadways or structures may be removed within Habitat Conservation Areas. Do not remove native shrubs or trees within Habitat Conservation Buffers, wetland buffers, or along drainage ditches that have summer base flow. Consult with the area supervisor before removing trees or brush within 250 feet of a stream. The county habitat biologist should be consulted before removing trees in an Habitat Conservation Area.

Removed shrubs and trees will be replaced as directed by a Habitat Conservation Plan or to replace an area equal to the vegetation area and tree canopy removed. Trees are replaced within the same basin.

Cover exposed soil with an erosion prevention cover BMP. Vegetate bare soils.

Within 250 feet of a water body or wetland, follow the practices of Activity: Vegetation and Pest Management in Stormwater Control Facilities

Activity: Bridge Channel Debris Removal

This activity involves removing any debris that has accumulated against or around a bridge in a stream channel where normal to high water flows occur. See Activity: Brush and Tree Clearing Near Bridges for information on managing vegetation on streamside areas. The main concerns for debris removal are preventing a hazard to the bridge while protecting stream habitat.

Any work that may modify a stream bed or stream bank requires consultation with Engineering staff and consultation with the Washington Department of Fish and Wildlife.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O3 Minimize vegetation removal
- O5 Protect public safety and health
- O6 Prevent catastrophic infrastructure failures
- O9 Protect infrastructure

Practices

Follow the Habitat Preservation Ordinance and Wetland Protection Ordinance requirements and obtain the needed permits before constructing access routes in stream buffers, wetlands or wetland buffers.

Only remove debris from channel and stream bank areas. Where no downstream obstructions exist, dislodge debris and turn it to flow downstream through the bridge. Only cut apart wood debris when necessary to clear it.

Do not remove any debris outside of the structure, stream channel or stream bank.

Follow source controls for petroleum and hydraulic fluid leaks.

Use ground cover BMPs for any bare soil and vegetate any bare areas with approved cover vegetation.

Consult with the Washington Department of Fish and Wildlife if any work involves modifications to the stream bank or channel. If an emergency exists, contact the Department of Fish and Wildlife for verbal approval.

Activity: Roadside Ditch Cleaning and Reshaping

This activity includes machine or hand cleaning of ditches, reshaping ditches to promote drainage, and managing any removed materials. This practice does not include ditches that have water flowing in them. See the stormwater facility O and M standards for Dry Drainage Ditches.

Protecting water quality dictates minimizing vegetation removal and preventing erosion.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O2 Prevent county/city roads, drainage systems, facilities and property from becoming pollutant sources
- O3 Minimize vegetation removal
- O7 Maintain or restore the intended infrastructure function
- O8 Prevent or reduce flooding
- O9 Protect infrastructure

Practices

Use mowing as the first method to reduce capacity loss. If mowing is insufficient, use ditch cleaning methods.

Where practical, perform work during dry weather.

Only clean areas where there is a flow restriction.

Never remove more vegetation than is absolutely needed. Leave untouched sections at least 200 feet long (where feasible) to act as sediment trapping filters between cleaned sections.

Remove small amounts of sediment by hand when performing routine maintenance.

Use sediment-trapping BMPs at the lower end of each excavated area to keep it from washing out of the work area or entering water bodies.

If there are problems with steep gradient or flowing water, use a stabilization BMP such as a silt mat on the ditch bottom.

Cover bare soils with a cover BMP. Vegetate bare soils. During summer, seeding may not be feasible. Hydroseed unvegetated soils in early fall to assure growth before rainy weather begins in October.

Transport sediment to the appropriate permitted site, grading project, or gravel pit reclamation project.

Avoid work within 250 feet of a stream, wetland or Habitat Conservation Area. If work is required to solve a drainage problem in a Habitat Conservation Area, use ground cover matting to stabilize the area and sediment trapping BMPs.

Activity: Culvert and Inlet Cleaning

This activity includes cleaning sediment and debris from culverts, inlets and other drainage structures less than 6 feet in diameter. These structures are in dry drainage ditches that do not contain water during dry weather. Cleaning is performed to restore drainage capacity using flushing equipment or hand tool.

If there is any question about whether the inlet is in a storm drain or a natural or altered stream, consult with the Washington Department of Fish and Wildlife.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O3 Minimize vegetation removal
- O7 Maintain or restore the intended infrastructure function
- O8 Prevent or reduce flooding
- O9 Protect infrastructure

Practices

Other than to address a threat to public safety or property due to flooding, perform work during the dry season.

Minimize soil disturbance. Never remove more vegetation than is absolutely needed.

Use sediment controls to trap any sediment and prevent sediment from entering storm sewer and water bodies. Sediment trapping BMPs are used to the extent practical during emergencies.

Cover bare soils with a cover BMP. Vegetate bare soils. During summer, seeding may not be feasible. Unvegetated soil will be hydro-seeded in early fall to assure growth before rainy weather begins in October.

If there are problems with steep gradient or flowing water, use a stabilization BMP such as a silt mat on the ditch bottom.

Transport sediment to the appropriate permitted site, grading project, or gravel pit reclamation project.

Avoid work within 250 feet of a stream, wetland or Habitat Conservation Area. If work is required to solve a drainage problem in a Habitat Conservation Area, use ground cover matting to stabilize the area and sediment trapping BMPs.

Activity: Minor Culvert Repair (not in a stream)

This activity is the replacement or repair of culverts and inlets less than 6 feet in diameter. It applies only to structures that are in ditches built specifically for drainage and do not carry water during dry weather.

If there is any question about whether the ditch is a storm drain or a natural or altered stream, consult with the Washington Department of Fish and Wildlife.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O3 Minimize vegetation removal
- O7 Maintain or restore the intended infrastructure function
- O8 Prevent or reduce flooding
- O9 Protect infrastructure

Practices

Other than to address a threat to public safety or property due to flooding, perform work during the dry season.

Minimize soil disturbance. Never remove more vegetation than is absolutely needed.

Use sediment controls to trap any sediment and prevent sediment from entering storm sewer and water bodies. Sediment trapping BMPs are used to the extent practical during emergencies.

If there are problems with steep gradient or flowing water, use a stabilization BMP such as a silt mat on the ditch bottom.

Cover bare soils with a cover BMP. Vegetate bare soils. During summer, seeding may not be feasible. Unvegetated soil will be hydro-seeded in early fall to assure growth before rainy weather begins in October.

Transport sediment to the appropriate permitted site, grading project, or gravel pit reclamation project.

Avoid work within 250 feet of a stream, wetland or Habitat Conservation Area. If work is required to solve a drainage problem in a Habitat Conservation Area, use ground cover matting to stabilize the area and sediment trapping BMPs.

Activity: Major Culvert Repair (At a Stream Crossing)

This activity is the replacement or repair of culverts and inlets greater than 6 feet in diameter or bridging a stream or ditch with flowing water during dry weather. If there is any question about whether the ditch is a storm drain or a stream consult with a supervisor, crew chief or Washington Department of Fish and Wildlife.

Practices

These projects are designed by engineering staff and must meet all regulatory requirements. Follow practices specified by engineering staff and permit conditions.

Activity: Erosion Repair

This activity includes the clean up and repair caused by erosion or minor soil failures. It involves reshaping the slope using material on site, importing fill material and removing material.

This activity does not include larger slide or stream erosion projects, which are overseen by an engineer who specifies the BMPs

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O2 Prevent county/city roads, drainage systems, facilities and property from becoming pollutant sources
- O3 Minimize vegetation removal
- O4 Preserve native plants
- O5 Protect public safety and health
- O6 Prevent catastrophic infrastructure failures
- O7 Maintain or restore the intended infrastructure function
- O9 Protect infrastructure

Practices

Unless work is to address a threat to public safety or property, perform work during dry weather.

Never remove more vegetation than is absolutely necessary to complete the job.

Use sediment-trapping BMPs at the lower end of each excavated area. Trap sediment that is generated by work to keep it from entering water bodies.

Cover bare soils with a cover BMP. Vegetate bare soils.

Transport sediment to the appropriate permitted site, grading project, or gravel pit reclamation project.

Avoid work within 250 feet of a stream, wetland or Habitat Conservation Area. If work is required to solve a drainage problem in a Habitat Conservation Area, use ground cover matting to stabilize the area and sediment trapping BMPs.

Activity: Emergency Slide/Washout Repair

This activity is emergency actions that must be immediately taken to avoid an imminent threat to public health or safety, or to prevent an imminent threat of serious environmental degradation (Section 197-11-880 WAC).

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O5 Protect public safety and health
- O6 Prevent catastrophic infrastructure failures
- O7 Maintain or restore the intended infrastructure function
- O9 Protect infrastructure

Practices

Install sediment control BMPs.

Use BMPs to avoid or minimize additional impacts to streams and wetlands.

If possible, divert water around the work area with temporary measures such as sandbags.

Transport sediment to the appropriate permitted site, grading project, or gravel pit reclamation project.

Install cover BMPs on bare soil and vegetate the area.

Where required, emergency permits will be obtained from appropriate agencies. Possible permits include:

- Grading
- SEPA
- Shoreline
- State HPA
- Flood Plain

Activity: Bridge Deck Cleaning and Maintenance

These are minor activities to care for bridge decks such as patching and cleaning sediment. Consultation with Washington Department of Fish and Wildlife is required if the work will impact a stream.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O2 Prevent county/city roads, drainage systems, facilities and property from becoming pollutant sources
- O5 Protect public safety and health
- O7 Maintain or restore the intended infrastructure function
- O9 Protect infrastructure

Practices

Block drains during pressure washing or cleaning to route water off the deck and prevent material from entering water bodies.

Collect and properly dispose of debris. Use screening on the ground or in a catch basin to filter out particles for disposal as solid waste.

Sweep up debris at the end of each workday.

Properly dispose of any removed material according to standard procedures.

Activity: Bridge Structure Maintenance

This activity includes a variety of activities that may be part of routine bridge maintenance. They include washing, scraping, and painting. If activities are part of a project, the project engineer will specify BMPs after consultation with Washington Department of Fish and Wildlife.

Bridges are almost always in Habitat Conservation Areas where clearing must be limited.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O3 Minimize vegetation removal
- O4 Preserve native plants
- O5 Protect public safety and health
- O7 Maintain or restore the intended infrastructure function
- O9 Protect infrastructure
- O10 Meet public expectations for aesthetics

Practices

Block drains during washing or cleaning to route water off the deck to prevent debris, paint chips and paint from entering surface water. Sweep up debris at the end of each workday.

Collect debris and properly dispose of it. Use screening on the ground or in a catch basin to filter out particles for disposal as solid waste or hazardous material.

Use netting or other material to catch material dislodged from beneath (King County BMP 3.4.6 or 3.4.8).

Properly dispose of any removed material according to standard procedures.

Most Clark County bridges are constructed of concrete and have little or no surfaces that have been covered by lead-based paint. If paint is being removed and there is a chance that it is lead based, paint chips are tested for lead content and use lead control and safety practices if lead, cadmium or chromium is found. Contact the safety officer for information on control and safety practices.

Have spill control and cleanup materials on site.

When applying paint, use paints that minimize environmental risk. Roll paint when feasible.

Minimize disturbing vegetation to trimming branches. If vegetation or trees must be removed to complete the project, replace the vegetation and tree with an equal type and area covered at the site or another within the same basin.

Activity: Chemical Road De-Icer Use

This is a practice of using a chemical to prevent or retard ice formation on roads and structures. The primary purpose is to protect public safety.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O2 Prevent county/city roads, drainage systems, facilities and property from becoming pollutant sources
- O5 Protect public safety and health

Practices

Limit de-icer use to areas where traffic hazards occur. Apply the current Washington Department of Transportation approved material.

List sites where de-icer is required. Use de-icer as specified in manufacturer's instructions. Follow materials storage and transfer BMPs in the Clark County Stormwater Pollution Control Manual.

Activity: Sanding for Ice

Sand is used to provide traction in certain areas where snow and ice cause safety problems.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O2 Prevent county/city roads, drainage systems, facilities and property from becoming pollutant sources
- O5 Protect public safety and health

Practices

Recover and reuse sand by using pick-up sweepers in urban areas, within 250 feet of lakes, ponds and streams, and on bridges.

In rural areas, and not near a water body, sweep sand onto vegetated shoulders.

Properly store sand and use containment or covering BMPs specified in the Clark County Stormwater Pollution Control Manual.

Activity: Snow Removal

This activity is snow removal from roads, shoulders, and bridges using various snowplowing devices. Plowed snow can include sediment and debris from roads and shoulders.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O3 Minimize vegetation removal
- O4 Preserve native plants
- O5 Protect public safety and health
- O7 Maintain or restore the intended infrastructure function

Practices

Minimize the amount of sediment and debris entering water bodies. When moving snow and ice, avoid pushing or casting snow directly into a water body.

Consider the influence that plowed or cast snow has on roadside vegetation. Minimize crushing or disturbance of roadside shrubs and trees within Habitat Conservation Areas.

Reduce speed, change plow angle or use other methods to protect water bodies and sensitive habitat areas.

Activity: Road Surface Maintenance

This activity includes surface repairs and paving jobs. Tasks include using asphaltic concrete, midland pavement, and other materials for patching potholes, filling cracks, paving shoulders, and overlaying roads. If the job cuts or places concrete, see the concrete work activity BMPs.

The major concern is rainfall runoff carrying oils from the work area and particles of material being washed or swept into storm drains or water bodies.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O3 Minimize vegetation removal
- O5 Protect public safety and health
- O7 Maintain or restore the intended infrastructure function
- O9 Protect infrastructure

Practices

If resurfacing work is performed under contract, specify BMP performance under inspection/contract administration.

Prevent debris, oils, cleaning agents, and sediment from entering waterways. If feasible block inlets and drains.

Avoid work in wet weather. This will reduce the problems of containing sediment or oil laden runoff from the job.

Carry spill control kit.

If the work is creating sediment or other pollutants that can be washed from the work area, protect storm drains. Use the following practices as feasible.

- Cover storm sewer inlets, catch basins and open manholes to prevent or block sediment-bearing water.
- If runoff contains oil and grease use sandbags, booms, or other absorbent products to trap oil at inlets or in drainage ditches. Use catch basin inserts with oil trapping material.
- If runoff contains sediment, use gravel-filled filter bags or other appropriate products to build berms around inlets. Gravel-filled bags are more stable than chip-filled bags.
- At stream crossings, trap materials using screens or another form of containment. Use containment BMPs to protect roadside ditches during wet weather.

Avoid using water to clean up work sites. Sweep or vacuum dust and debris from the repair job. Do not wash materials into storm sewers.

Properly contain and dispose of any residue from cleaning tools. Use heat to clean equipment where possible, avoiding solvents. If vehicles and equipment are left at the site overnight, use drip pans to contain leaks.

Minimize vehicle and equipment cleaning at the site. If cleaning is performed, dispose of cleaning residue in a sanitary sewer or into a grassy area or small temporary infiltration pit.

Place cold mix and material stockpiles away from drainageways. Cover or contain stock piles to prevent material or residues from washing off.

Recycle asphalt and fill material when possible.

Activity: Concrete Work

This activity is the installation, cutting, or repair of concrete facilities such as road surfaces, curb and gutter, sidewalks, and drainage structures.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O5 Protect public safety and health
- O7 Maintain or restore the intended infrastructure function

Practices

When necessary, place storm drain covers or containment devices over all drain inlets or discharge points at the beginning of each workday. Remove all accumulated material at the end of each workday. Properly dispose of the material.

Dispose of concrete where it will not wash into a water body, ditch or storm drain. Collect slurry from exposed aggregate washing, grinding water, and any truck washout and dispose of it properly. It is acceptable to dig a hole to hold any slurry or rinse water.

Use curing and form release materials that minimize pollutant discharge.

Do not use water to wash down the area.

Activity: Shoulder Blading

This activity is blading and shaping of unpaved shoulders to correct ruts, sediment accumulation, excessive plant material accumulation, and to maintain drainage from the pavement to the ditch. It usually involves work on relatively flat gravel shoulders.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O2 Prevent county/city roads, drainage systems, facilities and property from becoming pollutant sources
- O3 Minimize vegetation removal
- O5 Protect public safety and health
- O7 Maintain or restore the intended infrastructure function

Practices

Try to limit this work to dry weather.

Minimize vegetation removal. If soils are disturbed beyond the top of the ditch or on a slope, apply erosion prevention BMPs and vegetate the bare areas.

Avoid or minimize vegetation removal within Habitat Conservation Areas, and wetland buffers. Consider avoiding shoulder blading.

Activity: Shoulder Rebuilding

This activity is an expansion from shoulder blading that involves adding material to the shoulder, reshaping, and compacting aggregate. It may also include removing material. Shoulders are generally cleared and mowed areas vegetated with grass and brush and are not specifically subject to requirements of the Habitat Conservation Ordinance.

If work will take place between the road and stream, and increases the size of the shoulder or impacts vegetation or a stream channel, consult with an engineer to determine if permits are required.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O3 Minimize vegetation removal
- O4 Preserve native plants
- O7 Maintain or restore the intended infrastructure function
- O9 Protect infrastructure

Practices

Use erosion controls and prevent sediment and debris from entering water bodies and wetlands. Apply sediment control BMPs at the outside edges of the work area.

Minimize vegetation removal. Avoid or minimize vegetation removal within Habitat Conservation Areas and wetland buffers.

Where possible, create a grassy vegetated slope area between the road and ditch bottom when rebuilding a shoulder.

Activity: Pavement Marking

This activity includes striping roadway surfaces and applying other markings such as hot plastic material to define special traffic control features such as crosswalks, and application of special markers using adhesives.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O2 Prevent county/city roads, drainage systems, facilities and property from becoming pollutant sources
- O5 Protect public safety and health

Practices

As current paint stocks are consumed, water based or low VOC paints replace them.

Prevent paint from entering storm sewers and water bodies. Use over-spray control.

Store paint in spill proof containers or covered areas. Clean up spills during storage and handling.

When cleaning up, use methods that properly contain and dispose of unused paint, cleaning materials, and other spent materials.

When removing markings, prevent debris from entering water bodies. Clean up debris from grinding or power washing and dispose of it according to standard procedures.

Avoid using water to clean pavement and do not wash debris into storm sewers or ditches. Protect inlets, manholes and roadside ditches during any washing activities.

Activity: Sign Installation and Repair

This activity is the routine replacement, installation, repair, straightening and cleaning of signs.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O3 Minimize vegetation removal
- O5 Protect public safety and health
- O7 Maintain or restore the intended infrastructure function

Practices

Prevent disturbed soil from entering storm sewer or surface water bodies. Seed bare soils.

Avoid discharging cleaners to storm sewers or surface water by making sure they run into vegetated areas or limiting the amount used.

Clean up any materials or debris left by the work.

Attempt to avoid placing signs in areas where there are shrubs and trees that will have to be removed and periodically cleared to keep the sign visible.

Activity: Traffic Signal Maintenance

This activity is the routine repair and preventative maintenance of traffic signals and luminaires, including lamps, poles and bases.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O3 Minimize vegetation removal
- O5 Protect public safety and health
- O7 Maintain or restore the intended infrastructure function

Practices

Prevent disturbed soil from entering storm sewer or surface water bodies. Use sediment trapping or cover BMPs and seed bare soils.

Avoid discharging cleaners to storm sewers or surface water by making sure they run into vegetated areas or limiting the amount used.

Clean up any materials or debris left by the work.

Activity: Maintenance of Posts, Guardrails, Concrete barriers and Other Road Features

This activity is the routine repair and replacement of guardrails and similar features. It can include straightening and minor excavation.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O3 Minimize vegetation removal
- O5 Protect public safety and health
- O7 Maintain or restore the intended infrastructure function
- O10 Meet public expectations for aesthetics

Practices

Prevent disturbed soil from entering storm sewer or surface water bodies.

Minimize the area of soil disturbance.

If soil is disturbed, use sediment trapping and cover BMPs. Seed disturbed soils if the area will sustain vegetation.

Prevent pollutants such as paint and debris from entering storm sewer or surface water bodies.

If power washing, avoid discharging water and debris directly to storm sewers or surface water by trapping with gravel-filled bags and blocking inlets. If sand blasting, contain and sweep up residues and dispose of them following standard procedures.

Carry a spill response kit.

Chapter 4. Spill and Hazardous Materials Response

Spill or hazardous materials response applies to any activity. It includes finding abandoned containers on county/city right-of-way or drainage structures; spills to roads, ditches or storm structures; and clean up and vehicle accidents.

Clark County Public Works has written procedures for reporting and responding to spills or abandoned materials. Contact the safety officer for more information. These procedures are subject to change as training, equipment, and staff changes occur.

8/27/99 (Revised 9/9/99)
Preliminary Draft
Spill Response Policy for the Public Works Department

Clark County
Department of Public Works
Policy Statement
Personnel Policies:
Spill/Incident Response will in the Office or while in the field

Purpose/Intent: This policy ensures that all Public Works employees understand notification procedures for calls or field discovery of chemicals spills (specifically, chemical spills into the County stormwater sewer system, as well as into surface and groundwater), abandoned chemical containers or garbage or trash.

Individual divisions and sections that have field staff that investigate, collect or clean up materials must have proper training and procedures in place.

Affected Department Value(s): Comprehensive Vision, Communication, Credibility, Commitment, and Conservation

Responsibilities and Affected Parties: This policy applies to all Public Works employees. All employees are responsible to ensure compliance with this policy.

Policy Provisions:

1.0 Spills and Leaking Containers

When an employee receives call or discovers a chemical spill into the County Stormwater System (roadside ditches, retention/detention ponds, drywells, and catch basins), and/or into surface water or groundwater (e.g., via drywell, etc.), the employee shall immediately take the following information from the caller:

- a. Caller's name, telephone number, address, and where they can be reached later that day;
- b. The address of the spill;
- c. The physical location of the spill (e.g., northeast side of intersection...; near mile marker...; north on highway near...creek, etc.); and

- d. License plates numbers, names of individuals, company names/logos on vehicles, if available.

Notification and tracking procedure

1. *Call 911 (Emergency Services) and report the call and information*

2. Call the Washington Department of Ecology Spill Response at 360-407-6300
3. Notify Public Works, Operations Division at 397-2446 that a call has been report to 911 and to the Washington Department of Ecology Spill Response
4. Call Code Enforcement at 397-2375, extension 4184 to establish a case file in the “Tidemark” system

2.0 Abandoned Non-leaking Chemical Containers

Calls about contained material such as paint cans or barrels, calls should go to:

1. Public Works, Operations Division at 397-2446. Operations will evaluate the situation and complete the notification and reporting procedure.

3.0 Trash and Garbage

Calls about garbage and trash should go to:

1. Public Works, Operations Division at 397-2446. Operations will evaluate the situation and complete the notification and reporting procedure.

Activity: Accident Clean Up

This activity involves clean up of debris and spilled automotive fluids at accident scenes. Larger spills are discussed in the Spill Response Activity.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O2 Prevent county/city roads, drainage systems, facilities and property from becoming pollutant sources
- O5 Protect public safety and health
- O7 Maintain or restore the intended infrastructure function

Practices

Follow county/city procedures for spill cleanup. Each maintenance vehicle has spill response instructions. Contact the Public Works safety officer for more information.

Activity: Spill Response (*illicit dumping or chemical spill*)

This is in response to a spill on a county/city-owned road or a spill impacting a storm sewer owned or operated by Clark County or the City of Vancouver.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O2 Prevent county/city roads, drainage systems, facilities and property from becoming pollutant sources
- O5 Protect public safety and health
- O6 Prevent catastrophic infrastructure failures
- O7 Maintain or restore the intended infrastructure function

Practices

Follow practices defined in the spill reporting or response plan and policies. Each maintenance vehicle has spill response instructions. Contact the Public Works safety officer for more information.

Activity: Abandoned Container Response

This is response to discovery of abandoned waste containers on roads or other facilities owned or operated by Clark County or the City of Vancouver.

Outcomes

- O2 Prevent county/city roads, drainage systems, facilities and property from becoming pollutant sources
- O5 Protect public safety and health

Practices

Follow practices defined in the abandoned materials policy. Each maintenance vehicle has instructions on responding to abandoned containers. Contact the Public Works safety officer for more information.

Chapter 5. Facilities Operation:

Facilities operation includes a variety of activities such materials stockpiling, fuel storage, fueling stations, vehicle repair, and equipment storage.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O2 Prevent county/city roads, drainage systems, facilities and property from becoming pollutant sources

Practices

Clark County follows best management practices required by Clark County's Water Quality Ordinance. These are in the Clark County Stormwater Pollution Control Manual. The City of Vancouver also follows the best management practices described in the county manual.

Chapter 6. Decant Facility Operation:

The Clark County decant facility separates solids from liquids in materials vacuumed from catch basins, drywells and other stormwater structures. The facility operates under a plan approved by the Southwest Washington Health District.

Liquids are separated from solids, treated and conveyed to a grass-lined basin. The basin has an outflow valve to sanitary sewer. Sediment is disposed of following the operating plan, usually as a small part of fill material under new road surfaces.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O2 Prevent county/city roads, drainage systems, facilities and property from becoming pollutant sources

Practices

Follow practices defined in the decant facility standard operating procedures. These are on file at the Operations center at 4700 NE 78th St.

Chapter 7. Vegetation Management Goals, Vegetation Management Areas, and General BMPs

Vegetation management activities listed here are performed by grounds maintenance crews who care for parks, natural areas, landscaped areas and other special facilities such as Tri-Mountain Golf Course. Roadside vegetation management is covered in Chapter 3, Road Operation and Maintenance.

Chapter 8, Description of Vegetation and Pest Management Practices provides specific practices for each vegetation management activity in this chapter.

Vegetation management practices are adapted, with minor modifications for format and local practices, from City of Portland Parks Pest Management Policy (April 1999).

General Goals and Philosophy

Clark County and the City of Vancouver recognize the special importance of the rivers, streams, wetlands, ponds, and stormwater treatment facilities that fall under our stewardship. The sensitive nature of such habitats, their plant and animal communities, and their direct link with other waterways require that we establish specific policies to ensure their health. These sets of practices for vegetation management, pesticide use and fertilizer use establish guidelines and limitations regarding maintenance for waterways and adjacent county/city lands.

All landscape management decisions for controlling unwanted vegetation, diseases, and pests will follow Integrated Pest Management principles and decision-making rationale. These are

- Proper planning and management decisions begin the IPM process.
- Cultural methods of vegetation and pest control are preferred and are first employed.
- Mechanical means of vegetation and pest control are next in line of preference, and are utilized where feasible.
- Biological methods of vegetation and pest control are considered before chemical means, where they are feasible.
- Botanical and synthetic pesticides are used only when no other feasible methods exist.

Main Categories of Vegetation Management Areas

Vegetation management practices vary for areas having different management objectives. The standards here apply to all areas, but more strict controls are placed on areas where code or policy dictate that native vegetation be preserved and in areas near water bodies. These are identified for each activity. There are special management areas for pesticide and fertilizer use in 25 foot setbacks from water bodies and in stormwater control facilities. Special clearing requirements apply in areas defined by the Clark County's Habitat Conservation Ordinance.

All Areas

Practices for vegetation management apply as minimum standards for all areas. More restrictive standards and practices for protected habitat and water body setbacks are listed in each activity.

Habitat Conservation Areas

Clark County Code defines two general types of habitat buffers for water bodies. Habitat Conservation Preservation Buffers under Chapter 13.51 and Wetland Protection Buffers under Chapter 13.36. Vancouver habitat protections are in Chapter 20.59 VMC. Wetlands requirements are in Chapter 20.50 VMC.

County wetland buffers can range from 50 feet for low-grade wetlands to 300 feet for the high-quality, Category 1 Wetlands.

County riparian buffers under Chapter 13.51 range from 150 feet on each side of tiny streams to 250 feet on each side of larger streams and rivers. Riparian habitat also includes area within the 100-year flood plain. Other priority habitats are defined by map areas.

There are computer-based maps showing the riparian buffers for many streams. While this mapping is fairly complete, the original maps were too small to show the exact location of a stream buffer in the field. Consulting the priority habitat maps provides a good estimate of where these areas occur. The maps show the buffer width, which in turn allows a field measurement to determine the buffer width.

Few wetlands or wetlands buffers are mapped because very few wetlands are accurately mapped. Consult wetland maps or check with technical staff regarding the potential area and buffers for a wetland. Separate practices are established for vegetation management and pest control near water bodies and inside county Habitat Conservation Areas which include protections for existing trees and shrubs and special set backs from water bodies for controls on pesticide and fertilizer use. Vegetation management practice for specific activities or types of area such as intensively managed parks or natural areas are listed in Chapter 8, Vegetation Management Activities.

Water Body Setbacks for Pesticide and Fertilizer Use.

Portland Parks Bureau policies for pesticide and fertilizer use established special requirements for 25 foot buffers or setbacks from water bodies. These same setbacks and policies are adapted for Clark County and the City of Vancouver.

Descriptions and Examples of Types of Vegetation Management Areas and Activities

The county has grouped landscape management activities by the condition and use of the area. These can include areas inside Habitat Conservation Areas, areas in water body set backs for pesticide and fertilizer use, and areas remote from Habitat Conservation Areas or water bodies.

Park landscapes near waterways, lakes and ponds are divided into four classifications, ranging from intensively managed high-use areas to intact natural areas. The classifications describe their current features, as well as define the differing objectives and maintenance rationales of their care. Along with these landscapes, there are activities for maintaining storm sewer facilities and constructed wetlands.

Features and Objectives in Highly-Managed Areas.

These are areas where there is exceptionally high traffic and can include areas where there are special standards for vegetation maintenance.

Examples: Klineline Pond, Tri-Mountain fairways, Lewisville Park, Vancouver Lake Park, Leverich Park, Daybreak Park, Marine Park, Frenchmans Bar, and Waterfront Park.

Features of Highly Managed Areas:

- Ornamental landscape
- Public access and activity
- High public use
- Mowing of turf, sometimes to edge of waterway
- May have facilities adjacent to water
- May have highly modified stream banks
- Often limited plantings in water body buffers

Objectives for Highly Managed Areas

- Healthy plants and turf
- Maintain ability to handle high use
- May have high expectation for aesthetics in general
- Minimize need for chemical intervention
- Control invasive plants
- Safe access
- No bare soil areas
- Low tolerance for weeds

Features and Objectives in Less-Managed Areas

Less-managed areas can include a wide variety of areas where there is a lower level of vegetation management due to public access or the area is within a water body buffer. General examples are road shoulders, less used or natural areas in developed parks, and unused land where seasonal or less frequent vegetation management occurs.

Examples: Salmon Creek Greenway, Kings Pond, rail line cut and fill slopes, Discovery Trail, David Douglas Park, Daybreak Park, Lucia Falls, Pleasant Valley Park, and Lewisville Park.

Features of Less Managed Areas:

- There is a mix of native and non-native plants
- Water bodies are have adjacent areas of predominantly native plants
- Some impacts from use and park development apparent in water body buffers
- Managed landscapes may be nearby
- Stream bank erosion may be occurring due to use

Objectives for Less Managed Areas:

- Maintain healthy plants in HCAs or water body buffers

- Minimize need for chemical intervention
- Control invasive plants where feasible
- Minimize impact on water body buffers
- No bare soil areas
- Tolerance for natural appearance and weeds

Features and Objectives in Impacted Natural Areas

Impacted natural areas are generally in parks and undeveloped land. These areas may or may not be in Habitat Conservation Areas or water body set backs.

Examples: Cougar Creek below 119th St., Salmon Creek Greenway, Discovery Trail, LaCenter Bottoms, Lewis River Greenway, Whipple Creek Park, Beaver Marsh Natural Preserve, and Marine Park.

Features of Impacted Areas:

- Very limited impact to native vegetation
- Stream banks are buffered with predominately native plants
- There are observable limited impacts from use and park development
- Managed landscapes are not nearby

Objectives for Impacted Areas:

- Maintain healthy plant community
- Minimize need for chemical intervention
- Lower tolerance of invasive plants, non- natives
- Minimize any impacts on buffer
- No bare soil areas are allowed

Features and Objectives in Intact Natural Areas

Intact natural areas are rare and exceptional places where there is intact and self-sustaining native vegetation.

Examples: Camp Lewisville, Salmon Creek Greenway, Whipple Creek Park, Vancouver Lake Lowlands, and Discovery Trail.

Features of Intact Natural Areas:

- Very limited visitor impact
- Native plant communities exist
- No nearby developed park areas

Objectives for Intact Natural Areas:

- Maintain healthy plant community
- No tolerance of invasive plants, non-natives
- Minimize any impacts from activities

Features and Objectives in Stormwater Facilities

Stormwater facilities are constructed features that control or treat stormwater. The most common types of facility are swales, ponds and treatment wetlands. Many include vegetation for treatment, habitat or aesthetics. Specific maintenance requirements are included in activities for storm sewer maintenance.

Examples: Tenny Pond, Glenwood II, and NE 63rd Street Facility.

Features of Stormwater Facilities:

There is a mix of native and non-native plants

Generally not used by the public

Include areas managed to promote design function, such as turf in swales

Managed landscapes may be nearby

Objectives for Intermediate Areas:

Maintain healthy plant communities

Minimize need for chemical intervention

Control invasive plants where feasible

No bare soil areas are allowed

Tolerance for natural appearance and weeds

Features and Objectives in Constructed Wetlands

Constructed wetlands refer to wetlands built to replace lost wetlands or as a habitat feature. They are not stormwater facilities and considered natural surface water bodies. Constructed wetlands have specific plans for establishing and maintaining vegetation which should be consulted and followed in addition to the requirements in this manual.

Examples: Pleasant Valley North and Meadowbrook Marsh

Features of Constructed Wetlands:

Limited public access

Plants may or may not be well established depending on age and condition

Objectives for Constructed Wetlands:

Maintain healthy plant communities

Minimize need for chemical intervention

Low tolerance of invasive plants, non- natives

Bare soil areas are not allowed

Use Only Appropriate Plants

Clark County and City of Vancouver each have adopted a list of approved plants for use in development projects. The list also has prohibited undesirable plants. Only plants approved for use in the Clark County Plant List are allowed for use in plantings in unincorporated areas. The Vancouver plant list applies inside the city limits.

Mulching

Mulches and other ground coverings are useful during the installation and restoration of landscapes as well as their ongoing maintenance. Mulches meet a variety of needs. They suppress weeds, help to retain moisture around plants, reduce possible erosion, and provide visual enhancement.

Always consider the possible impacts when using mulches, which may include:

- Inadvertent introduction of non-native weeds and diseases to the site.
- Leaching of substances such as tannins from the mulch into nearby waterways.
- Migration of mulch material into waterways.
- Nutrient leaching into waterways.

The most serious problems are probably introduction of weeds and diseases. Routine maintenance in waterway buffers should minimize the use of mulches. Mulching is best used as a part of restoration activity. Mulching in areas that are below typical high water lines is discouraged in any buffer areas.

It is permissible to plant cover crops to control erosion in buffer zones. Cover crops should never introduce any persistent non-native plant species.

Use Low-Volume Directed-Pesticide Application Equipment

Pesticide delivery will be by hand with directed, low volume, single wand sprayers, wiping, daubing and painting equipment, injections systems, or drop spreaders. Typically, application is performed using backpack sprayers, but may also include using the same hand application methods with larger tanks. These delivery methods have low volume applications and low pressure spraying which minimizes the formation of fine mists that might drift off target. It also helps make sure that pesticides will reach targeted plants or targeted soil surfaces.

Minimize Pesticide Drift

Managing drift is of particular importance when surface waters are nearby. Application equipment used in the application shall employ all necessary methods to limit drift. Nozzle size, pressure regulation, droplet size, and height of spray wand, are all techniques that can be modified to reduce unwanted drift of pesticides.

Spray applications are not be allowed in a water body set back area when:

- wind speed is above 8 mph
- wind direction or activity would carry pesticides toward, or deposit them upon open water

Use Acceptable Pesticides

To minimize possible aquatic impacts, only a limited group of pesticides are allowed in buffer areas. Only the pesticides specifically listed in the following tables may be used as specified in each activity. Generally, restrictions fall into two groups: general use outside of water body set backs and within 25 foot water body set backs. This selection of pesticides considers any possible effects on aquatic life as well as pesticide tendencies to move in the environment.

This list of pesticides may be revised to include or drop compounds. Reasons for changes include the potential for plants to become tolerant or build resistance to specific compounds, addition of a new compound to state approved pesticides, or federal or state removal of a pesticide.

Materials allowed in Buffer Areas in Certain Circumstances (see individual activities):

Post emergent herbicides:

Glyphosate products: Roundup Pro, Rodeo
Triclopyr products: Garlon 3A (or other amine formulations only, not Garlon 4)
Surfactant (i.e. R-11)

Pre-emergent herbicides:

Oryzalin (Surflan)
Napropamide (Devrinol)

Materials Allowed in for Use in Aquatic Habitats under Certain Circumstances:

Aquatic labeled only:

Glyphosate (Rodeo)
Approved surfactant (R-11 or equivalent)
Aquashade (acid blue 9, acid yellow 23)

The following matrix gives specific guidelines for pesticide and fertilizer use in 25-foot water-body set backs that have varying levels of management. Pesticide and fertilizer use also depends on whether the activity is routine maintenance or restoration and construction projects.

See the requirements for each maintenance activity in Chapter 9 for specifics in each area.

Use of pesticides and fertilizers within 25-foot water body set backs

Chemical used	MAINTENANCE ACTIVITY	Intensively Managed Areas	Less Intensively Managed Areas/Stormwater Facilities	Impacted areas and Constructed Wetlands	Intact Natural Areas
Pre-emergent herbicide use possible?	Routine Maintenance	Only in shrub beds above high water line	Not Allowed	Not Allowed	Not Allowed
	During Construction or Restoration	Only in shrub beds above high water line	Not Allowed	Not Allowed	Not Allowed
Glyphosate use possible?	Routine Maintenance	Spot spray and broadcast spray	Spot spray and broadcast spray	Spot spray and broadcast spray	<i>Spot spray for target list weeds only*</i>
	During Construction or Restoration	Spot spray and broadcast spray	Spot spray and broadcast spray	Spot spray and broadcast spray	<i>Spot spray and broadcast spray for non-natives*</i>
Triclopyr use possible?	Routine Maintenance	Cut and treat stems. Spot spray	Cut and treat stems. <i>Spot spray to establish monocots*</i>	Cut and treat stems. Spot spray	Not Allowed
	During Construction or Restoration	Cut and treat stems. <i>Broadcast spray*</i>	Cut and treat stems. <i>Spot spray/broadcast to establish monocots*</i>	Cut and treat stems. <i>Broadcast spray*</i>	Not Allowed
Fertilizer Used:					
Slow release fertilizer use possible?	Routine Maintenance	Directed applications to shrub beds if no flooding possible	Not Allowed	Not Allowed	Not Allowed
	During Construction or Restoration	Directed applications if no flooding possible	Directed applications if no flooding possible	Directed applications if no flooding possible	Directed applications if no flooding possible

** requires approval of Manager, or Wetland Ecologist*

Materials Available for Tree Injections

If a pest or disease threatens the health of *important and valuable trees* within a Habitat Conservation Area or 25-foot water body set back, there may be a need to treat them. Instances of this occurring are rare however. The intent and limit of this exception to the approved buffer area pesticide list is to allow only the insecticides or fungicides necessary to combat direct threats to the health of valuable trees. In these special cases, the use of injected pesticides may be employed, with the following limitations:

- The pesticide applied must be delivered by methods that inject or otherwise distribute the material entirely within interior tree tissues.
- Pesticides will not be injected into the soil surrounding the tree. Tree surfaces will not be sprayed or treated with pesticides, with the exception of approved fungicides and biological agents.

Following These BMPs in All Other Areas:

Water body setbacks have the most restrictive controls on pesticide and fertilizer use. Generally, the standards for outside setbacks are quite similar. See each individual vegetation management activity for specific requirements.

Keep Good Records of Pesticide Use (Record Keeping Requirements)

Regular application record keeping requirements are required for all pesticide applications. Records shall include:

- Applicator name and license number;
- Date and the time intervals of the application;
- Location of application;
- Temperature and wind conditions;
- Materials and concentrations used; and
- Amount applied, coverage rate, and equipment used.

Have a State Applicators' Licenses

All personnel who apply pesticides to Clark County or City of Vancouver lands must be Washington Department of Agriculture licensed applicators or have a license recognized by the Washington Department of Agriculture. Only licensed personnel who have received an additional aquatics license certification may apply pesticides to aquatic sites.

Chapter 8. Vegetation Management Activities

This section describes specific vegetation management activities and the best management practices to follow.

Refer to Chapter 7 for description of the types of areas and description of the practices required by this chapter.

Activity: Clark County Weed Management Department Noxious Weed Control on County Property

REVISION DATE: 9/21/99

Background

The Weed Management Department is administered by the Weed Management Board. Weed Management Board members are appointed by the Clark County Commissioners. The Weed Management Department is responsible by state law for controlling noxious weeds in Clark County. This Department also performs most of the chemical noxious weed control on county right of way.

In 1996 the Weed Management Department established a noxious weed control program for along county rights-of-way that they oversee. The department reviewed prior practices, chemicals used, impact on vegetation, environmental concerns regarding weed control and established a set of standards they would use to for control of noxious weeds. Weed Management is currently responsible for noxious weed control along approximately 1300 center lane miles of Clark roads and periodically in stormwater facilities.

Practices

Due to the limited time frame for weed control along with the size of Clark County, the County was divided into four geographic areas in order to implement an effective weed control program. By working through one area at a time, Weed Management will review and treat all County right of ways. After working through each area, the program continues to monitor treated areas, effectively becoming a maintenance program to prevent and reduce re-vegetation of noxious weeds on county right-of-ways.

Spot treatment is used for all noxious weed control applications along county rights-of-way. By implementing a spot-treatment program, Weed Management is able to utilize the training and knowledge of their employees, while insuring the least impact possible on the environment.

Spot treatment is performed using backpack sprayers, wick applicators, and manual removal of noxious weeds. Spot treatment consists of various techniques for applying herbicides to target weeds without negatively impacting desirable vegetation or other non-target organisms. Spot-treatment reduces herbicide use, lowers cost, and also lowers risk to non-target organisms including humans, and reduces spray drift. Spot treatment benefits include:

- Selective weed removal
- Cuts down on weed regrowth
- Allows native vegetation to grow, while preventing further weed growth

Weed Management utilizes backpack sprayers, which hold herbicide in a container strapped to the back when doing spot treatment of noxious weeds. A hand-held nozzle allows the herbicide to be applied to selective areas, such as the base of stems or the tops of plants.

Wick applicators are highly selective application tools that directly brush herbicide onto target plants. This system addresses water quality concerns, when removing noxious weeds in designated wetland areas, or other areas near a water source. Applying herbicide using a wick applicator allows the ability to control the herbicide applications to a very limited specific area of the weed, while protecting other sensitive vegetation.

Manual removal of noxious weeds in highly sensitive areas, is a practical and efficient method of removing small isolated patches of weeds.

Applicator Requirements

In accordance with RCW 17.21, the Washington Pesticide Application Act, Section 220, Weed Management employees who apply herbicides are fully trained to identify noxious weeds, endangered species plants and also licensed to apply chemical herbicides for weed removal.

Chemical Applications

Herbicides utilized on county road rights-of-way are biodegradable in the environment. No compound determined to be carcinogenic or potentially carcinogenic by the U.S. Occupational Safety and Health Administration are used. Any type of long-term residual chemical must have properties that allow it to strongly bind to the soil to prevent its movement from the site of application, unless covered with pavement which prevent water movement into soil profile.

All chemical applications are in strict compliance with the label directions and Weed Management policy. Applications will generally be made on days with a wind of less than 8 mph to minimize drift of material, and on days when rainfall is not likely to occur immediately following application to prevent excessive runoff of material.

Monitoring and Record Keeping

In accordance with WAC 16-228-190; Applicator Requirements, applicators shall keep records that include the following:

- Name of the person for whom the chemical was applied.
- Address or location of the land where the pesticide was applied.
- The year, month, day and time the pesticide was applied.
- The trade name and/or common name of the chemical which was applied and/or EPA registration number of the product.
- The direction and estimated velocity of the wind and the temperature at the time the chemical was applied.
- The amount, or amount and concentration of the chemical(s) applied, which may be recorded to the nearest ounce of active ingredient or the nearest gallon of liquid spray.
- Specific crop or site to which chemical was applied.
- Apparatus license plate number.
- Applicators name (Clark County), and address and the name of the individual making the application.
- Acreage or area treated.

Application records shall be completed and available to the department the same day the chemicals were applied. Application records shall be kept for a period of three years from the date of the chemical application. Records shall be furnished to the Department of Agriculture, following receipt of written request. Records will be readily available also to medical personnel, the Pesticide Incident Reporting and Tracking Panel, the Department of Health of Labor and Industries.

All apparatus shall be kept in good repair and only that apparatus capable of performing all functions necessary to insure proper and thorough application of chemicals shall be used. Apparatus shall be cleaned so that no residue remains which may cause injury to land, including humans, desirable plants and animals, from subsequent application.

Clark County shall make available necessary safety equipment in proper working order and advise the employees on its use to meet the safety requirements of the chemical label.

Applicator will maintain a uniform mixture at all times in operating apparatus when applying chemicals.

Activity: Clark Public Utilities Tree Trimming Standards for Overhead Power Lines

Clark Public Utilities has a program to prevent trees brush from causing power outages. Clark Public Utilities follows a set of standards for tree trimming and removal. The standards also include limited use of herbicide on stumps.

Activity: Maintaining Shrub Beds in Highly Managed Areas

This activity is caring for shrubs and plants in high-use areas such as day use parks, road medians, landscaped areas along roads, and public building landscapes. Due to their use as public areas and surroundings to public buildings, there is a low tolerance for weeds in these areas. Maintenance includes pruning, plant replacement, flower planting, plant removal, weeding and bark dust or mulch placement, litter removal, edging and irrigation system operation.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O2 Prevent county/city roads, drainage systems, facilities and property from becoming pollutant sources
- O3 Minimize vegetation removal
- O4 Preserve native plants
- O5 Protect public safety and health
- O7 Maintain or restore the intended infrastructure function
- O10 Meet public expectations for aesthetics

Practices

The main goal in maintaining these areas is sustaining the appearance of the planting bed. This is largely through weed control, pruning, and mulching.

Vegetation is trimmed to keep clear “sight distances” and to keep signs visible. Trees and shrubbery are trimmed to allow street sweepers clear access to curbs.

Only use plants on the list of Plant Materials for Clark County Rights-of Way, the City of Vancouver plant list, or the Clark County Plant List (Ordinance 1995-01-26).

Do not remove native shrubs or trees within stream buffers, wetland buffers, or along drainage ditches that have base flow. Consult with the area supervisor before removing trees or brush within 250 feet of a stream.

When applying bark dust or mulch, make sure that it is placed in a manner that prevents it from washing into storm sewers, ditches or streams. Bare spots are minimized by the use of mulch or appropriate cover plants to prevent erosion. Cover bare soils with an erosion prevention cover BMP. Vegetate bare soils.

Minimize the use of mulches within 25 feet of a waterbody.

Hand remove weeds such as black berry vines, nightshade, scotch broom, English ivy, and holly, while keeping other bushes and trees. Chemical intervention is minimized.

Follow BMPs for pesticide and fertilizer application, storage, disposal and record keeping as outlined in the Chapter 7.

Follow chemical use listed in the attached table. This list of pesticides and fertilizers may be revised to include or drop compounds. Reasons for changes include the potential for plants to become tolerant or build resistance to specific compounds, addition of a new compound to state approved pesticides, or federal or state removal of a pesticide.

Use of Pesticides and Fertilizers in for Shrub Beds in Highly-Managed Areas

Chemical used	Maintenance Activity	Allowed Uses
Pre-emergent herbicide use possible?	Routine Maintenance	Only in shrub beds above high water line
	During Construction or Restoration	Only in shrub beds above high water line
Glyphosate use possible?	Routine Maintenance	Spot spray and broadcast spray
	During Construction or Restoration	Spot spray and Broadcast spray
Triclopyr use possible?	Routine Maintenance	Cut and treat stems. Spot spray
	During Construction or Restoration	Cut and treat stems. <i>Broadcast spray*</i>
Fertilizer Used:	Maintenance Activity	Allowed Uses
Slow release fertilizer use possible?	Routine Maintenance	Directed applications to shrub beds if no flooding possible
	During Construction or Restoration	Directed applications if no flooding possible

** requires approval of Parks Manager or Wetland Ecologist*

Activity: Landscaped Turf Maintenance (Highly-Managed Areas)

This activity is caring for turf in landscaped areas such as parks, road medians, and around buildings. It includes mowing, fertilizing, herbicide use, sweeping, raking, top dressing, aerating, edging, debris removal, and irrigation.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O2 Prevent county/city roads, drainage systems, facilities and property from becoming pollutant sources
- O3 Minimize vegetation removal
- O5 Protect public safety and health
- O7 Maintain or restore the intended infrastructure function
- O10 Meet public expectations for aesthetics

Practices

The main goal in maintaining these areas is maintaining appearance and vigorous turf growth for high-traffic areas. This includes having healthy turf and plants, minimizing weeds and bare spots, and providing safe access to the water.

Only use plants on the City of Vancouver plant list or the Clark County Plant List (Ordinance 1995-01-26).

Bare spots are minimized by seeding turf.

Mower clippings are left on the ground unless they are so thick that they cover the turf. Minimize the use of mulches within 25 feet of a water body.

Chemical intervention is minimized. This includes spot spraying for weeds and minimizing insecticides and fungicides. Fertilizer use is limited to that needed to sustain intended use.

Follow chemical use listed in the attached table. Outside of the 25-foot water body set back, fertilizers are applied to sustain turf growth. Lime is applied once per year. This list of pesticides and fertilizers may be revised to include or drop compounds. Reasons for changes include the potential for plants to become tolerant or build resistance to specific compounds, addition of a new compound to state approved pesticides, or federal or state removal of a pesticide.

Follow BMPs for pesticide and fertilizer application, storage, disposal and record keeping as outlined in Chapter 7.

Where feasible, turf areas will be fitted with computerized irrigation systems to better maintain turf during the summer. Better irrigation will allow more frequent mowing and better control irrigation runoff.

Turf Management in Near Lakes and Ponds

Several parks have intensively maintained turf extending to the edge of water bodies. In these areas, special management measures are used as much as feasible considering the

management objectives. Special measures include more frequent, low rate fertilizer application or temperature release fertilizer and computerized irrigation systems that prevent over watering and fertilizer runoff.

Use of Pesticides and Fertilizers for Turf Management (Highly Managed Areas)

Chemical used	Maintenance Activity	Allowed Uses
Pre-emergent herbicide use possible?	Routine Maintenance	Only in shrub beds above high water line
	During Construction or Restoration	Only in shrub beds above high water line
Glyphosate use possible?	Routine Maintenance	Spot spray and broadcast spray
	During Construction or Restoration	Spot spray and broadcast spray
Triclopyr use possible?	Routine Maintenance	Cut and treat stems. Spot spray
	During Construction or Restoration	Cut and treat stems. <i>Broadcast spray*</i>
Fertilizer Used:	Maintenance Activity	Allowed Uses
Slow release fertilizer use possible?	Routine Maintenance	Directed applications to if no flooding possible
	During Construction or Restoration	Directed applications if no flooding possible

** requires approval of Parks Manager or Wetland Ecologist*

Activity: Maintaining Roadsides and Lower Use Areas of Parks

This activity is lower intensity management of plants along roads and lower use areas of parks, or other low use landscapes. There is a higher tolerance for weeds in these areas than in day-use parks and landscaped areas around public buildings.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O2 Prevent county/city roads, drainage systems, facilities and property from becoming pollutant sources
- O3 Minimize vegetation removal
- O4 Preserve native plants
- O5 Protect public safety and health
- O7 Maintain or restore the intended infrastructure function
- O10 Meet public expectations for aesthetics

Practices

The main goal in maintaining these areas is maintaining appearance with a minimum amount of work and chemical intervention. This largely includes controlling weeds.

Consider hardiness and drought tolerance when selecting plants. Only use plants on the City of Vancouver plant list or the Clark County Plant List (Ordinance 1995-01-26).

Do not remove native shrubs or trees within stream buffers, wetland buffers, or along drainage ditches that have base flow. Consult with the area supervisor before removing trees or brush within 250 feet of a stream.

If there is a water body or ditch with water flow during dry weather, only remove desirable shrubs or bushes when sight distance is an issue, and after checking with the area supervisor.

When applying mulches or bark dust, make sure that it will not wash off into storm sewer, ditches or streams. Bare spots are minimized by the use of mulch or appropriate cover plants to prevent erosion. Cover bare soils with an erosion prevention cover BMP. Vegetate bare soils.

Hand remove weeds such as black berry vines, nightshade, scotch broom, English ivy, and holly, while keeping other bushes and trees. Chemical intervention is minimized.

The attached list of pesticides and fertilizers may be revised to include or drop compounds. Reasons for changes include the potential for plants to become tolerant or build resistance to specific compounds, addition of a new compound to state approved pesticides, or federal or state removal of a pesticide.

Use of Pesticides and Fertilizers in Lower Use Areas and Roadside Plantings

Chemical used	Maintenance Activity	Allowed Uses
Pre-emergent herbicide use possible?	Routine Maintenance	Only in shrub beds above high water line
	During Construction or Restoration	Only in shrub beds above high water line
Glyphosate use possible?	Routine Maintenance	Spot spray and broadcast spray
	During Construction or Restoration	Spot spray and broadcast spray
Triclopyr use possible?	Routine Maintenance	Cut and treat stems. Spot spray
	During Construction or Restoration	Cut and treat stems. <i>Broadcast spray*</i>
Fertilizer Used:	Maintenance Activity	Allowed Uses
Slow release fertilizer use possible?	Routine Maintenance	Directed applications to shrub beds if no flooding possible
	During Construction or Restoration	Directed applications if no flooding possible

** requires approval of Parks Manager or Wetland Ecologist*

Activity: Vegetation and Pest Management in Less-Managed Areas

These are areas in parks or other lands that are less actively managed than turf or shrub beds. These areas may include degraded or modified natural areas or unused land that is maintained periodically or seasonally. In Habitat Conservation Areas, these land areas are maintained for the purpose of establishing natural vegetation. There is a tolerance for natural appearance and weeds. There may be some use such as water access by the public, but that is not the primary use of the area.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O2 Prevent county/city roads, drainage systems, facilities and property from becoming pollutant sources
- O3 Minimize vegetation removal
- O4 Preserve native plants
- O7 Maintain or restore the intended infrastructure function

Practices

Practices in these less-managed areas focus on establishing and maintaining healthy native plantings. This includes controlling invasive plants where feasible, minimizing the human impact on the buffer, and planting cover on bare soils.

Follow BMPs for pesticide and fertilizer application, storage, disposal and record keeping as outlined in the following section.

Within natural areas, limit the use of mulches to covering bare soils while establishing plantings.

Only use plants on the City of Vancouver plant list or the Clark County Plant List (Ordinance 1995-01-26).

Pesticide and fertilizer should be avoided within 25 feet of a water body.

The attached list of pesticides and fertilizers may be revised to include or drop compounds. Reasons for changes include the potential for plants to become tolerant or build resistance to specific compounds, addition of a new compound to state approved pesticides, or federal or state removal of a pesticide.

Use of Pesticides and Fertilizers in Less-Managed Areas

Chemical used	Maintenance Activity	Allowed Uses
Pre-emergent herbicide use possible?	Routine Maintenance	Not Allowed
	During Construction or Restoration	Not Allowed
Glyphosate use possible?	Routine Maintenance	Spot spray and broadcast spray
	During Construction or Restoration	Spot spray and Broadcast spray
Triclopyr use possible?	Routine Maintenance	Cut and treat stems. Spot spray
	During Construction or Restoration	Cut and treat stems. <i>Broadcast spray*</i>
Fertilizer Used:	Maintenance Activity	Allowed Uses
Slow release fertilizer use possible?	Routine Maintenance	Not Allowed
	During Construction or Restoration	Directed applications if no flooding possible

** requires approval of Parks Manager or Wetland Ecologist*

Notes:

Activity: Vegetation and Pest Management in Impacted Natural Areas

Impacted natural areas are predominately native plants and limited influence from public use and park development. The main objective is to maintain and improve the healthy plant community. Impacted areas have a lower tolerance for invasive or non-native plants.

Outcomes

- O4 Preserve native plants
- O7 Maintain or restore the intended infrastructure function

Practices

Practices in these areas focus on establishing and maintaining healthy native plantings. This includes more vigorously controlling invasive plants and the human impact on the buffer. It also includes covering for bare soils with native plants.

Only use plants on the City of Vancouver plant list or the Clark County Plant List (Ordinance 1995-01-26).

Limit mulch use to covering bare soil while establishing plantings.

Pesticide and fertilizer use is minimized and is avoided if possible within 25 feet of a water body.

Follow BMPs for pesticide and fertilizer application, storage, disposal and record keeping as outlined in Chapter 7. The attached list of pesticides and fertilizers may be revised to include or drop compounds. Reasons for changes include the potential for plants to become tolerant or build resistance to specific compounds, addition of a new compound to state approved pesticides, or federal or state removal of a pesticide.

Use of Pesticides and Fertilizers in Impacted Natural Areas

Chemical used	Maintenance Activity	Allowed Uses
Pre-emergent herbicide use possible?	Routine Maintenance	Not Allowed
	During Construction or Restoration	Not Allowed
Glyphosate use possible?	Routine Maintenance	Spot spray and broadcast spray
	During Construction or Restoration	Spot spray and Broadcast spray
Triclopyr use possible?	Routine Maintenance	Cut and treat stems. <i>Spot spray to establish monocots*</i>
	During Construction or Restoration	Cut and treat stems. <i>Spot spray/broadcast to establish monocots*</i>
Fertilizer Used:	Maintenance Activity	Allowed Uses
Slow release fertilizer use possible?	Routine Maintenance	Not Allowed
	During Construction or Restoration	Directed applications if no flooding possible

** requires approval of Parks Manager or Wetland Ecologist*

Notes:

Activity: Vegetation and Pest Management in Intact Natural Areas

Intact natural areas are separate from developed parks and have very limited public access. They have established native plant communities. The objective is to maintain the healthy plant buffer and provide wildlife habitat. There is no tolerance for invasive or non-native plants. There is little public access to these areas other than trails.

Outcomes

- O4 Preserve native plants
- O7 Maintain or restore the intended infrastructure function

Practices

Practices in these areas focus on maintaining healthy native plantings. This includes vigorously controlling invasive plants and human impact on the buffer.

Only use plants on the City of Vancouver plant list or the Clark County Plant List (Ordinance 1995-01-26).

Avoid the use of mulches.

Pesticide and fertilizer use is minimized or not allowed.

Follow BMPs for pesticide and fertilizer application, storage, disposal and record keeping as outlined in Chapter 7. The attached list of pesticides and fertilizers may be revised to include or drop compounds. Reasons for changes include the potential for plants to become tolerant or build resistance to specific compounds, addition of a new compound to state approved pesticides, or federal or state removal of a pesticide.

Use of Pesticides and Fertilizers in Intact Natural Areas of Habitat Buffers

Chemical used	Maintenance Activity	Allowed Uses
Pre-emergent herbicide use possible?	Routine Maintenance	Not Allowed
	During Construction or Restoration	Not Allowed
Glyphosate use possible?	Routine Maintenance	Spot spray and broadcast spray
	During Construction or Restoration	Spot spray and broadcast spray
Triclopyr use possible?	Routine Maintenance	Cut and treat stems. <i>Spot spray to establish monocots*</i>
	During Construction or Restoration	Cut and treat stems. <i>Spot spray/broadcast to establish monocots*</i>
Fertilizer Used:	Maintenance Activity	Allowed Uses
Slow release fertilizer use possible?	Routine Maintenance	Not Allowed
	During Construction or Restoration	Directed applications if no flooding possible

** requires approval of Parks Manager*

Notes:

Activity: Vegetation and Pest Management in Stormwater Control Facilities

Stormwater control facilities include biofiltration treatment swales, treatment wetlands, treatment ponds, detention ponds, open channels, and infiltration basins. Stormwater control facilities discharge to surface water or groundwater either directly or through pipes or ditches. Many facilities are built to remove pollutants from stormwater.

Generally, vegetation should be maintained to blend into surrounding areas. Stormwater facilities can provide habitat for aquatic life and birds. Promoting natural vegetation where feasible improves habitat. Swales often blend into intensively managed landscapes. Pond perimeters can *include natural vegetation.

The use of pesticides and, in most cases fertilizer, is not compatible with the task of pollutant removal or the direct connection of stormwater facilities to streams and groundwater.

Features of Stormwater Facilities:

- There is a mix of native and non-native plants
- Generally not used by the public
- Include areas managed to promote design function, such as turf in swales
- Managed landscapes may be nearby
- May be used by fish and wildlife

Objectives for Stormwater Facilities:

- Maintain healthy plant communities
- Avoid or minimize need for chemical intervention
- Control invasive plants where feasible
- No bare soil areas are allowed
- Tolerance for natural appearance and weeds

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O2 Prevent county/city roads, drainage systems, facilities and property from becoming pollutant sources
- O3 Minimize vegetation removal
- O4 Preserve native plants
- O7 Maintain or restore the intended infrastructure function
- O8 Prevent or reduce flooding
- O10 Meet public expectations for aesthetics

Practices

Pest management practices in stormwater facilities mirror the less-managed park areas. The focus is establishing and maintaining healthy, low-maintenance native or landscape plantings and sustaining the design function of vegetated filters such as biofiltration swales. This

includes controlling invasive plants where feasible, minimizing the human impact on the buffer, and planting cover on bare soils.

Only use plants on the City of Vancouver plant list or the Clark County Plant List (Ordinance 1995-01-26).

In some cases, the original plantings may not be appropriate for the actual condition at a facility. One example is a frequently flooded swale that cannot support normal turf. In cases like this, replace turf with appropriate plants if the underlying drainage problem cannot be fixed.

Consider the use of soil amendments such as compost before using fertilizer.

Limit mulch use to covering bare soil while establishing plantings.

Follow BMPs for pesticide and fertilizer application, storage, disposal and record keeping as outlined in Chapter 7. The attached list of pesticides and fertilizers may be revised to include or drop compounds. Reasons for changes include the potential for plants to become tolerant or build resistance to specific compounds, addition of a new compound to state approved pesticides, or federal or state removal of a pesticide.

Chemical use should be avoided within 25 feet of any area that holds or conveys surface water or stormwater. This includes the base of a biofiltration swale.

Stormwater treatment and control facilities, including wetlands, intercept storm water runoff before it enters surface water or groundwater. There are no provisions for herbicide use below the high water line of these facilities.

Trees or shrubs that block access roads may be trimmed (or removed if within the access road) at the time of when access is required for maintenance by heavy equipment.

Trees that pose a risk to stormwater structures due to root growth may be removed and replaced by smaller shrubs.

Use of Pesticides and Fertilizers in Stormwater Facilities

Chemical used	Maintenance Activity	Allowed Uses
Pre-emergent herbicide use possible?	Routine Maintenance	Not Allowed
	During Construction or Restoration	Not Allowed
Glyphosate use possible?	Routine Maintenance	Spot spray and broadcast spray
	During Construction or Restoration	Spot spray and Broadcast spray
Triclopyr use possible?	Routine Maintenance	Cut and treat stems. Spot spray
	During Construction or Restoration	Cut and treat stems. <i>Broadcast spray*</i>
Fertilizer Used:	Maintenance Activity	Allowed Uses
Slow release fertilizer use possible?	Routine Maintenance	Not Allowed
	During Construction or Restoration	Directed applications if no flooding possible

** requires approval of Parks Manager or Wetland Ecologist*

Notes:

Activity: Vegetation and Pest Management in Constructed Wetland Areas

The county builds wetlands to mitigate for wetlands lost during road construction or other public works. These are not stormwater facilities, but compensation for wetlands taken during construction projects. This activity applies only to parts of wetlands that are not subject to inundation during the growing season. Operations or Parks crews use no chemical controls in wetland water bodies.

Noxious weed controls by the Weed Management Department may include herbicide use in wetlands.

Constructed wetlands progress from little or no natural vegetation to an ideal state where they are self-sustaining natural areas. As water bodies, wetlands connect to streams and groundwater. Wetlands also host insects, fish, amphibians, and birds that are sensitive to horticultural chemicals. Because of this, chemical use should be minimized in wetland buffers. Wetland management has a low tolerance for invasive or non-native plants.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O2 Prevent county/city roads, drainage systems, facilities and property from becoming pollutant sources
- O3 Minimize vegetation removal
- O4 Preserve native plants
- O7 Maintain or restore the intended infrastructure function

Practices

Practices in these areas focus on establishing and maintaining healthy native plantings. This includes more vigorously controlling invasive plants and the human impact on the buffer. It also includes covering for bare soils.

Only use plants on the City of Vancouver plant list or the Clark County Plant List (Ordinance 1995-01-26).

Consider the use of soil amendments such as compost before using fertilizer.

Limit mulch use to covering bare soil while establishing plantings.

Chemical intervention is minimized and is avoided if possible within 25 feet of a water body.

Follow BMPs for pesticide and fertilizer application, storage, disposal and record keeping as outlined in Chapter 7. The attached list of pesticides and fertilizers may be revised to include or drop compounds. Reasons for changes include the potential for plants to become tolerant or build resistance to specific compounds, addition of a new compound to state approved pesticides, or federal or state removal of a pesticide.

Use of Pesticides and Fertilizers in Constructed Wetlands

Chemical used	Maintenance Activity	Allowed Uses
Pre-emergent herbicide use possible?	Routine Maintenance	Not Allowed
	During Construction or Restoration	Not Allowed
Glyphosate use possible?	Routine Maintenance	Spot spray and broadcast spray
	During Construction or Restoration	Spot spray and broadcast spray
Triclopyr use possible?	Routine Maintenance	Cut and treat stems. <i>Spot spray to establish monocots*</i>
	During Construction or Restoration	Cut and treat stems. <i>Spot spray/broadcast to establish monocots*</i>
Fertilizer Used:	Maintenance Activity	Allowed Uses
Slow release fertilizer use possible?	Routine Maintenance	Not Allowed
	During Construction or Restoration	Directed applications if no flooding possible

** requires approval of Parks Manager or Wetland Ecologist*

Notes:

Activity: Weed Control within Water Bodies

Specific practices are allowed in water bodies such as streams, ponds and wetlands. Chemical controls are allowed only in extreme cases where there is a threat of near complete habitat loss due to an invasive weed.

Weed control within natural water bodies requires an authorization under the State Hydraulic Code. Activities such as dredging require approval from the Washington Department of Fish and Wildlife. Mechanical harvesting is allowed without consultation with Washington Department of Fish and Wildlife if practices in their publication #APD-1-98, *Aquatic Plants and Fish* are followed.

Within Streams

In the rare need for control of noxious weeds and invasive non-native plants within a stream itself, mechanical and biological means will be utilized.

Within Pond and Lake Areas

Weed control is by mechanical removal. There are special requirements for disposal of aquatic weeds to prevent spreading seeds. The Parks Manager will determine the proper disposal methods.

Biological controls are used in some situations. Grass carp are allowed in Kline Pond, which does not have an outlet to surface water during normal flow conditions.

If an emergency situation arises where habitat is endangered by non-native invasive submerged weeds in ponds and lakes, the Manager may approve the use of an aquatic use approved herbicide for control as a last resort.

Herbicide use is only allowed where there is no direct outflow of the treated water to streams or waterways. The herbicide utilized shall be of very low toxicity to aquatic organisms, and be applied in such a way that there are no appreciable negative effects on the health of the aquatic environment.

Within Wetlands Areas

There are no provisions for the use of herbicides in open water areas in wetlands or constructed wetlands. Aquatic use approved herbicides may be used during establishment of constructed wetlands. The Weed Management Department may control noxious weeds in some cases.

Within Stormwater Ponds, Swale Treatment Areas and Treatment Wetlands

Stormwater treatment and control facilities, including wetlands, intercept storm water runoff before it enters surface water or groundwater. There are no provisions for herbicide use below the high water line of these facilities. The Weed Management Department may control noxious weeds in some cases.

Notes:

Activity: Vegetation Management at Golf Courses

This activity applies to Tri-Mountain Golf Course. The county owns Tri-Mountain Golf Course in the Ridgefield area. Golf Resources Northwest operates the course under contract by Facilities Management of the Generals Services Department.

Tri-Mountain has a complex drainage system for routing water away from the fairways. Layouts sometimes place putting greens and other finely manicured in-play areas near to natural and man-made water bodies. There may be almost no natural vegetation between water bodies and intensively managed turf.

Golf courses are complex sites for vegetation management. Objectives include both the appearance and quality the playing surface, as well as water quality and habitat issues. Each site should have an individualized program that considers unique landscape features and landscape maintenance goals.

Outcomes

- O1 Minimize sediment and pollutant discharges from the work area
- O2 Prevent county/city roads, drainage systems, facilities and property from becoming pollutant sources
- O3 Minimize vegetation removal
- O4 Preserve native plants
- O7 Maintain or restore the intended infrastructure function
- O10 Meet public expectations for aesthetics

Practices

Maintenance Practices for Highly Managed Areas in Play

- For fairways and areas around tees and greens, follow requirements for landscaped turf in highly-managed areas.
- Follow current practices for green and tee maintenance.

Maintenance of out of play areas

- Follow requirements for Maintaining Roadside Plantings and Lower Use Areas of Parks for out-of-play areas where seasonal mowing and weed control occur.
- Follow Vegetation and Pest Management in Impacted Natural Areas for natural areas or reestablishing permanent natural areas.

Notes:

Chapter 9. Other Facilities

Besides the storm sewer, roads and parks, there are facilities owned and operated by Clark County or the City which are subject to this manual. These facilities are listed in this chapter.

Activity: Lewis and Clark Railroad Operation and Maintenance

Clark County Public Works contracts for the operation and maintenance of the county-owned railroad. A private rail line leases the use of the rail line. The lessee is responsible for operating and maintaining the track. Clark County Public Works maintains the rest of the railroad right-of-way.

Clark County has the ability to require the lessee to follow all county code including the Habitat Conservation Ordinance and the Water Quality Ordinance.

Clark County Operations crews follow standard practices of the Habitat Conservation Plan for work in rail right-of-way.

Activity: Clark County Fairgrounds Operation and Maintenance

Clark County owns Clark County Fair Grounds. The Fair Grounds are expected to follow the practices in the Operations and Maintenance Best Management Practices for Publicly Owned Property, which includes provisions of the Stormwater Pollution Control Manual.

Chapter 10. Training

Training is an essential component to successful water quality BMP use. Simple diagrams and descriptions will not be adequate to demonstrate the use of many BMPs in the field. Training should include field demonstrations, videos, slide shows, and reference cards or field manuals.

Initiation Training

Training for new employees should include the basic do's and don'ts. Why things like dirt are a pollutant that we control during routine operations. What is absolutely not allowed, such as dumping excavated material into streams, washing debris into storm drains and streams, and so forth.

This training should set the base for added training about implementing BMPs.

BMP Training

Staff should be provided with basic manuals that include diagrams and descriptions of the practices to meet standards for water quality.

Crew chiefs and employees under their supervision should have training in BMP use for the activities they perform. Specific training, classroom and field, in the use of the BMP should lead to more successful implementation than simply providing a written manual.

Procedure Cards/Sheets

Cards can be made for each activity and the required BMPs. These can go to each vehicle as needed.

Every vehicle should have a card, describing spill and abandoned container response.

Water Quality Kits for Trucks

Each vehicle should be equipped with a water quality kit that contains:

Lightweight cover materials for exposed materials and eroding areas.

Seed mix for planting bare areas.

Sediment barriers for storm sewer inlets.

Absorbent for small spills

Drip pans for leaky vehicles.

Map/Track Problem Areas

Problem areas where erosion, sediment accumulation in ditches or other water quality problems occur should be mapped so that they can be systematically tracked and solutions documented.

Map Habitat Areas/Streams/Wetlands

Create wall maps and atlases that show the extent and type of Habitat Conservation Areas, known wetlands, and streams that require special consideration under county code.

The purpose of the maps is to raise awareness of the extent of these areas as well as simply show where they are.

Awards

Establish awards for actively performing environmental stewardship.